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TREATISE ON MILCH COWS.

TREATISE ON MILCH COWS: WHEREBY THE QUALITY AND QUANTITY OF MILK WHICH ANY COW WILL GIVE MAY BE ACCURATELY DETERMINED, BY OBSERVING NATURAL MARKS, OR EXTERNAL INDICATIONS ALONE; THE LENGTH OF TIME SHE WILL CONTINUE TO GIVE MILK, &c. &c. By M. FRANCIS GUENON, France. Translated from the French of the Author, for the Farmers' Library, by N. P. TRIST, late U. S. Consul at Havana. With Practical Observations and Remarks on Cattle, by JOHN S. SKINNER.

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CHAPTER I.

ACCOUNT OF THE DISCOVERY.

To give the history of my discovery, I must speak of myself. My narrative shall be succinct and short, although my labors have been protracted. But this is a condition attached to discoveries generally; we must meditate long upon what an instant has sufficed to reveal or suggest to us. It will be seen that, in my case, difficulties were always renewing.

I am the son of a gardener, and I followed for a long time this trade of my forefathers. Nature had given me an observing turn of mind; I was fond of bringing things together—of instituting comparisons between them—of deducing consequences. At an early period I became possessed by the idea that I was destined to make some important discovery in the branch of industry which I followed. Was this the suggestion of mere vanity? Be it as it may, the thought took root in my mind, and became for me a fixed idea. With a view to arriving at this wished-for discovery, I studied the works of the best writers on Botany and Agriculture; I learned Geometry and the art of Drawing, so far as it seemed necessary to me. I followed up all the ramifications of the vegetable kingdom, and applied myself to the study of the external signs by which plants and vegetables of different sorts might be distinguished, and their qualities and productiveness might be known beforehand.

To do this was to accomplish a good deal, no doubt; but my mind, still possessed by the idea of the great future discovery, was never at rest. I was, like Ahasuerus, under the hand of the angel; a voice within was constantly crying out, "Go on!" and I felt myself impelled forward; but I had no glimpse of the goal to which I was tending.

Chance led to the discovery of the famous Tyrian purple; to chance also is due an observation which was the germ of my discovery, and constitutes the basis of my method. When fourteen years of age, I used, according to country cus-

tom, to drive our only Cow to the grazing ground. I was very fond of her, and could have identified her among ever so many. One day, as I was whiling away the time in cleaning and scratching my poor old companion, I noticed that a sort of bran or dandruf detached itself in considerable quantities from certain spots on her hind parts, formed by the meeting of the hair, as it grew in opposite directions; which spots I have since called *ears*, from the resemblance they often bear to the bearded ears or heads of wheat or rye.* This fact attracted my attention, and I recollected having heard one of my grandfathers say that it was probable there were external marks on Cows, whereby their good qualities or their defects might be known—just as we judge of the vital force of a plant and its qualities by means of its leaves and the lines on its skin. My own thoughts now took this turn. Reflecting on the subject, I arrived at the conclusion that if, in the vegetable kingdom, there exist external signs, whereby the good and the bad qualities of a plant can be positively known, there ought to exist in the animal kingdom, also, marks whereby we may judge, by inspecting an animal, of its qualities, good and bad; and I thought that I had discovered one of these signs.

All this, however, was as yet but mere speculation—a brilliant theory, which experience might belie: it was necessary to interrogate Nature. The Cow which I tended was a good milker. I have already said that I knew her perfectly. I examined other Cows within my reach, to see if I should find the same signs in them. I sought for the bearded *ears* (*quirls*), and scratched those spots in quest of dandruf; the abundance or the scarcity of this being what first engaged my attention. Every new Cow was compared with my own as a standard, and her superiority, equality or inferiority determined in my own mind.

From this moment I spared nothing to follow up my observations; no fatigue was too great for me; I have often traveled several leagues in order to examine a single Cow. What was my exultation when, after I had formed my judgment of a Cow, the questions with which I belabored her owner brought forth answers that corroborated its accuracy! How often has it happened that people were convinced that the animal whose qualities I was pronouncing upon must have been previously known to me! My secret was the cause of astonishment to many; I took good care to keep it to myself.

In the course of the comparisons thus instituted by me, with reference to the dandruf alone, which was at first the only thing that governed me, I had occasion to remark that great diversities existed among Cows, in respect to the shape of the bearded ears (*quirls*) which produced the dandruf. This suggested a new train of reflections and observations, which resulted in my becoming convinced that these *shapes* were the signs by which to distinguish Cows, and to know the good and bad qualities of every individual among them. From that moment my discovery was made; but it was necessary to digest it into a system—above all, to establish its accuracy in all its parts, by proofs which should carry my own conviction into the minds of others. It was here that all my courage and perseverance was put in requisition.

It did not suffice to have discovered signs that were characteristic of different sorts of Cows; it was necessary to make sure that the same mark might always be relied upon as a positive and certain sign of the same perfection or defect.—

* These marks are, in some parts of our country, called *quirls*. Their occurrence in horses (particularly on the neck, under the mane) is well known to be a sign of *blood*. This is a remarkable coincidence; and it seems far from improbable that the discovery made by the author in regard to neat cattle will lead to similar discoveries respecting other domestic animals. [*American Translator.*

This could not be effected except by studying a vast number of individuals—by comparing them together—taking into consideration the countries from which they came—their stature—their yield. This was not all: they had to be classed. Conceive what toil this task involved for me, a plain child of Nature, who had no idea of such a classification, and found myself under the necessity of establishing one. The endeavor was one to absorb me entirely; I gave up my calling; I traveled about, visiting cattle markets, fairs, cow-stables; I questioned and cross-questioned all who might be expected to know most on the subject—husbandmen, dealers in cattle, men of the veterinary profession; I became convinced that my discovery had not been anticipated by any one. The marks for distinguishing a good Cow from a bad one varied according to the notions of each individual. Some looked to the shape of the horns—others upon that of the udder; some judged by the shape of the animal, or the color of her hair—others were determined in their choice by something else. But, in these various modes of judging, all was vague and uncertain. I became confirmed in the belief that I had made the important discovery of signs that were positive and certain; and, in order the better to satisfy myself of the solidity of the ground upon which my method was to rest, I took the precaution to return to the same localities at different times and seasons, that I might trace and ascertain the effects which might attend these variations of Nature. All my observations were accurately noted down; and I could at length flatter myself with having acquired a mass of facts which gave solidity and consistence to my system, and imparted the character of positive certainty to that which at first had been but a probable conjecture.

In 1822, I began to deal in cattle on my own account. This trade brought under my eyes a great number and variety of Cows from all quarters—from Switzerland, Holland, Brittany, Poitou, &c. &c.; and I had better opportunities than before for thoroughly examining the marks of these different races. My observations were multiplied, and I became convinced anew that all individuals possessing the same marks belonged to the same family, whatever might be the country of their birth; that these marks were an infallible indication of the same degree of superiority or inferiority; in a word, that Nature, always consistent with herself, acted, at all times and places, in the same way, and was always governed by the same laws.

For between seven and eight years, I had been incessantly engaged in establishing order among my observations, and arranging the results into one consistent whole. I established a classification, founded upon the shape or outline of the different marks: Cows were first divided into classes or families; then, in each of these classes, there was a threefold division, according to size—the *tall* or *high*, the *medium*, and the *low*; finally, each class was subdivided into orders, according to the diminution and the deformity of the distinctive mark of the class, as found in the different individuals belonging to it. This task was an immense one for me, and cost me a degree of trouble and an expenditure of time, of which a conception may be formed by considering how many comparisons and combinations were necessary to a person so unversed in scientific methods, before my materials could be reduced to order, and I could form a distinct and precise idea of my own discovery.

These difficulties, which might have disheartened any other person, did not discourage me. A system was to be created, and I created it. In 1828, I addressed to the Academy of Bordeaux a request, having for its object that my method should be examined and reported upon. I was not yet willing to disclose

my secret entirely; my object was to get the reality of my discovery and its results attested to. The Academy, without adopting my conclusions, did nevertheless make honorable mention of me, at its sitting of the 3d of June following, in these terms:

"M. Francis Guénon, of Libourne, possessor of a method which he deems infallible for judging, by mere visual examination, of the goodness of Milch Cows, and the quantity of milk which each can yield, has solicited the Academy to cause the efficaciousness of this method to be tested by repeated experiments. The case presented by this request was one of a secret method of judging, which the possessor was not willing to reveal. On the other hand, it seemed difficult to admit that the external signs, whatever they might be, by which M. Guénon judges, could always bear a proportional relation to the quantity of milk yielded by a Cow. Nevertheless, the Academy deemed it proper to appoint a Committee charged with making the examination.

"Trials have been made, with the care and under the precautions necessary for precluding all collusion. The Cows used for the purpose belonged to three different herds, and amounted to thirty in number, and the result has been to establish, to the satisfaction of the Committee, that M. Guénon really possesses great sagacity in this line. So long, however, as his method shall be kept secret, it cannot be judged of nor rewarded by the Academy.

"Governed by these considerations, the Academy, having ascertained from M. Guénon that he is willing to submit to every test that may be proposed, and to disclose his secret upon receiving a just indemnity, has referred him to the Prefect, and has engaged to recommend him to the favorable notice of that magistrate, who is ever disposed to promote all that tends to improvement."

Here the matter rested at that time. I did not then make up my mind to give my secret to the public; but I persevered in my observations and experiments, in order to perfect my discovery. In 1837, the Agricultural Society of Bordeaux determined to ascertain for itself what reality there might be in my system.—The result surpassed its expectation; the experiments made, in presence of the Committee appointed for the purpose, left no doubt as to the certainty of my method. Here are the terms in which the Committee expressed themselves in their report:

AGRICULTURAL SOCIETY OF BORDEAUX.

GUENON DISCOVERY.... MILCH COWS.

Report to the Agricultural Society of Bordeaux.

Gentlemen: The Committee appointed by you to examine into the discoveries of M. Francis Guénon, of Libourne, have the honor to submit to you the result of their investigations.

M. Guénon has established a natural method, by means of which it is easy to recognize and class the different kinds of Milch Cows, according to

1st. *The quantity of milk which they can yield daily.*
2d. *The period during which they will continue to give milk.*
3d. *The quality of their milk.*

Down to the present day, Gentlemen, the writers and professors who have the most particularly occupied themselves with the bovine race have been unable to do anything more than indicate some vague signs for judging of the fitness of Cows for secreting milk.

After more than twenty years of observations and researches, M. Guénon has succeeded at length in discovering certain natural and positive signs, which constitute the basis of his method; a method henceforward proof against all error.

Sensible of the necessity that your Committee should be fully convinced, and that they could not but look with some degree of distrust upon any results of the proposed trials of his method, unless they should know that those results rested upon tangible facts, and were nowise dependent upon guess work, M. Guénon began by imparting his secret to your Committee, and making them fully acquainted with the positive signs upon which he has founded his method. By means of these signs, which are all external and apparent, he has established eight classes or families, which embrace all the varieties of the Cow that are to be met with in the different parts of this kingdom. Each of these classes or families is subdivided into eight orders. It is divided, also, into three sections, so that each of the sections comprehends the eight orders; this last division

having reference merely to the size of the Cows, and serving to distinguish animals which, being the same in respect to the characteristic signs that serve to fix the class and the order to which they belong, differ in hight alone, and in their yield so far only as this is dependent upon size.

By means of this classification, which is no less clear and distinct than simple, we are enabled,

1st. To distinguish with ease, in any herd of Cows, each individual comprised in it, according to the quantity of milk which she is capable of yielding—from twenty-six quarts a day down to next to nothing, and all intermediate quantities.

2d. To know the qualities of the milk which each will give, as being creamy or serous.

3d. To determine during what time, after being got with calf, the Cow will continue to give milk.

This method—so precious, from the application of which it is susceptible, whether we be concerned in the yield of milk only, or whether we avail ourselves of it for the improvement of breeds, which are constantly liable to deterioration from mismanagement in crossing—acquires a new interest when we consider that it is applicable, not to full grown animals alone, but also to calves at so early an age as three months. Thus, on the one hand, it affords the means of forming a sure judgment of full grown animals, in regard to which we are often misled, by their form and their parentage, to entertain great expectations which are never realized; and, on the other hand, it secures the improvement of herds, by enabling us to dispose at once of those calves which can never repay the trouble and cost of rearing them.

This important end, hitherto so vainly aimed at, had it at length been attained? To ascertain this point is the duty with which your Committee were charged. The method of M. Guénon having been revealed to them, it remained to ascertain how far the essential signs upon which it rests might be susceptible of rigorous application.

With this view they passed several days in visiting a number of pasture fields, situated in localities that differed from each other, in order that the experiments might be made upon animals of different breeds, and under varying circumstances. They deem it proper to enter here into some details respecting their mode of proceeding, persuaded that you will thereby be the better enabled to understand and appreciate the merits of this method, and to form a correct judgment of the extent to which your protection is due to a discovery, which is submitted to you by the author with the greater confidence, because it bears directly upon the prosperity of the agriculturist.

Every Cow subjected to examination was separated from the rest. What M. Guénon had to say in regard to her was taken down in writing by one of the Committee; and immediately after the proprietor, who had kept at a distance, was interrogated, and such questions put to him as would tend to confirm or disprove the judgment pronounced by M. Guénon. In this way we have examined, in the most careful manner—note being taken of every fact and every observation made by any one present—upward of sixty Cows and Heifers; and we are bound to declare that every statement made by M. Guénon with respect to each of them, whether it regarded the quantity of milk, or the time during which the Cow continued to give milk after being got with calf, or, finally, the quality of the milk as being more or less creamy or serous, was confirmed, and its accuracy fully established. The only discrepancies which occurred were some slight differences in regard to the *quantity* of milk; but these, as we afterward fully satisfied ourselves, were caused entirely by the food of the animal being more or less abundant.

The results of this first test seemed conclusive; but they acquired new force from those of a second trial, in which the method was subjected to another test, through M. Guénon and his brother. Your Committee, availing themselves of the presence of the latter, caused the same Cows to be examined by the two brothers, but separately; so that, after a Cow had been inspected, and her qualities, as indicated by the signs in question, had been pronounced upon by one of the brothers, he was made to withdraw; then the other brother, who had kept aloof, was called up, and desired to state the qualities of the same animal. This mode of proceeding could not fail to give rise to differences—to contradictions, even—between the judgments of the two brothers, unless their method was a positive and sure one. Well! Gentlemen, we must say it—this last test was absolutely decisive: not only did the various judgments of the two brothers accord perfectly together, but they were in perfect accordance, also, with all that was said by the proprietors in regard to the qualities, good and bad, of every animal subjected to this examination.

To the proprietors and to the bystanders, all this was the more surprising, from the fact that the examination was no less prompt than its results were certain. It was, however, easy to perceive that they, ignorant as they were of the nature of the discovery, had but little confidence in it; and that they ascribed the cunning of M. Guénon simply to a great practical familiarity with Cows.

As to ourselves—for whom, as we have already informed you, Gentlemen, the method was no longer a secret—it was with constantly renewing feelings of interest and astonishment that we followed up these examinations and contemplated the accuracy of their results. Two members particularly of the Committee, whom their special pursuits and their physiological knowledge of domestic animals entitle to great confidence, had, from the very first examination, been struck with the truth and strength of the system, the successful applications of which were multiplying under our eyes. This system, Gentlemen, we do not fear to say it, is infallible. The signs upon which it is founded, ever constant, invariable in the place which they occupy, are strongly impressed upon the animal by the hand of Nature. To appreciate them becomes an easy task; all that is requisite being, after having examined the animal and ascertained what marks she bears, to examine the drawings and fix upon the one in which those same marks appear. Then, by means of a brief but precise explanation which refers to that drawing, the qualities of the animal under examination become known, and the class and order to which she naturally belongs are indicated. It is by proceeding thus—by examining, first, the marks upon the animal, and then seeking among the drawings for the one in which those marks were reproduced—that the members of your Committee, after witnessing the first experiment, have been able themselves to apply the system, and to form judgments which were afterward corroborated in the same way that those of M. Guénon were.

In the hight of our admiration, Gentlemen, it was a subject of lively regret that the whole Society were not present; but we have the consolation of hoping that each of you will soon experience the pleasure which we have enjoyed, and have it in his power to apply this discovery to his own use and benefit. M. Guénon is not disposed to keep it secret; he proposes, so soon as a list of three thousand subscribers shall have been filled, to publish a work, in which his system, completely developed, shall be placed in the strongest light. The distinctive signs of each class and each order will be exactly described, and accurately represented by engraved or lithographic drawings, and the quantity of milk which each description of Cow is capable of yielding will be stated.

By means of this faithful guide, which is within the capacity of every understanding, errors will be dispelled, and the ability to form correct judgments of Cows will become common to all classes o husbandmen. Before long, none but Cows and Bulls of the first order will be used to breed from; this race of animals, which has become degenerate through bad crosses, will be elevated; and, as in other species of domestic animals, individuals of pure blood will be readily obtainable. Then, guided by sure and positive knowledge respecting the future qualities of young Cattle, we shall no longer rear, at great expense for three or four years, a Calf whose secretion of milk can never be otherwise than small in quantity and poor in quality; while, on the other hand, we shall no longer blindly consign to the butcher, young animals that would repay all the care that could be bestowed upon them.

These considerations will, we feel persuaded, Gentlemen, determine you to encourage M. Guénon to the publication and dissemination of a method which promises to be so useful to the agriculturist. How many poor families, in the neighborhood of large cities, where there is always a great consumption of milk, find in a small number of Cows the means of their subsistence! How extensive a branch of trade is supported by the production of butter and cheese in many of our Provinces—Brittany, Normandy, the Pyrenees, and others! Holland and Switzerland, those countries of fine pastures, are they not indebted to this branch of husbandry for a prosperity which is ever reproducing itself, and never wearing out—a prosperity less rapid, less brilliant, perhaps, than that which results from adventurous traffic, but safer at least for those who depend upon it; which is never deceptive; which, more than any other, attaches man to his country, and favors morality, and seems sheltered from those political tempests which, in other lands, so often prostrate the tallest fortunes.

[Signed] GUICHENET, *Veterinary Professor of the Department.*
LECONTE,
F. PELISSIER.

After the reading of this Report, the Society decreed as follows:

1st. That a gold medal be awarded to M. Francis Guénon.

2d. That he be proclaimed a Member of this Society.

3d. That fifty copies of his work on Milch Cows be subscribed for.

4th. That a thousand copies of the Report be printed for distribution among the Agricultural Societies of France.

The foregoing proceedings took place at the General Meeting of the Society, at the House of the Prefecture, on the 4th of July.

A true extract.

[Signed] RICHIER, *Secretary General of the Society.*

AGRICULTURAL SOCIETY OF AURILLAC.

At its General Meeting of the 26th May, the following Report was presented and read on the subject of the experiments which I had been called upon to make:

Report.

Gentlemen: M. Francis Guénon, a husbandman of Libourne, has established a method, deemed by him infallible, by means of which, upon a mere inspection of any Milch Cow, she may be judged of, and we may know the quality of her milk, the quantity of it which she is capable of yielding, and also the time during which she can give milk.

A Committee appointed by the Agricultural Society of Bordeaux, and composed of several well informed agriculturists, and of a very distinguished Professor of the Veterinary art of the Department of Gironde, had already borne testimony, after putting it to numerous tests, to the efficaciousness of the system of M. Guénon; and the result of its observations had been published in a very remarkable Report, addressed to all the Agricultural Societies of France.

Your Society, considering that this discovery might be of high importance to our country, which derives its income chiefly from the product of Milch Cows, entered into correspondence with its author, and gladly accepted his obliging offer to come to Auvergne and subject his method to the test of experiment.

Yesterday, the 25th of May, M. Guénon arrived at Aurillac, and immediately proceeded with the members of your Committee to the *Veyrac* farm, belonging to the President of the Society.—He examined with the utmost care the fine cow stable of that domain, which embraces one hundred Cows, of the best varieties that we possess. He then began his experiments upon a number of Cows which were presented to him, and which had designedly been selected from among the best, the moderately good, and the most indifferent of the establishment. Upon each of these separately, M. Guénon pronounced with precision, both in regard to her daily yield of milk, and to the time during which she continued to give milk after being got with calf. We must acknowledge, Gentlemen, that his decisions corresponded almost invariably with the statements obtained from the persons in whose charge the Cows are. The only variances we had to notice were some very slight ones in regard to the quantity of milk. On this point, we must call your attention to the fact that the Cows of that establishment are always fed high, upon clover or other artificial grasses which considerably augment the quantity of milk; and that this may have caused the mistake of M. Guénon, which consisted in his pronouncing the yield to be a little less than it really is. It is to be remarked that he was totally unacquainted with the usages of the country in regard to the feeding of Cattle.

In order thoroughly to convince your Committee of the reality of the discovery, M. Guénon made us acquainted with the different signs upon which his method rests. With reference to these signs, which are external and apparent, and stamped by the hand of Nature upon each animal, he has established eight classes or families, that comprehend all the varieties of the Cow found in the various Provinces of France. Each class is divided into eight orders; and each of these orders into three sections, according to size, as being high, of medium hight, and low.

According to the numerous observations of the author, all Cows belong to some one of these classes or families, and take their place under some one of the eight orders of the class. Each class possesses marks differing in shape and size from those of the other classes; and these marks are easy to distinguish, on merely looking at them. In each class, the Cows of the first orders are the best of the class, and the yield of milk is in proportion to the order; so that the two higher orders are the most productive, the third and fourth orders tolerably good, and the others falling off more and more, according to their grade.

M. Guénon applied his system, in our presence, to a number of Cows which were presented to him a second time; he made us remark their various signs, which differed in size and shape, and were larger or smaller according as the Cow was a good or a bad milker. He informed us that his system is equally applicable to young animals, and that their future qualities in regard to the

production of milk can be judged of with equal certainty. In corroboration of this, he caused us to notice the same signs upon Calves three or four months old, and also upon Bulls destined for the next covering season. The cowherds stated that the Calves which had been assigned by him to the first orders were from Cows that gave a great deal of milk. Upon two splendid Bulls, of the fine breed of SALERS, which were of the same age, and exactly alike in hair and size, M. Guénon passed very different judgments: the one he pronounced good, and assigned to the first order of his *Flanders* class; the other he pronounced bad, and assigned to the fifth order of his *Horizontal* class.* He justified these judgments by very precise comparisons, and made us remark the difference that existed in the signs of the two animals.

This day, the 26th of May, M. Guénon has made new experiments at the Cattle Fair of the town of Aurillac, in presence of several members of the Central Agricultural Society and of the Sub-Societies, and of a great number of land-owners and agriculturists of Cantal and the neighboring Departments. The following is the manner in which your Committee have thought proper to proceed. Each Cow was examined separately by M. Guénon, who wrote his notes upon her, and delivered the paper, closed, to one of us. Immediately after, another member of the Committee questioned the owner of the Cow, or the person in charge of her, in regard to her daily yield of milk, its quality, and the time during which she continued to give milk after being got with calf. The answers were taken down in writing, and then compared with the notes written by M. Guenon. They were generally found to accord, and proved, to the satisfaction of your Committee and of every one present—all of whom attended with lively interest to these proceedings—that M. Guénon possesses great sagacity in judging of Cattle, and that his method rests upon a sure foundation.

An incident occurred to confirm us in this opinion. A farmer played the trick of bringing up for examination a Cow that had already been examined and pronounced upon. The notes written by M. Guénon on this occasion accorded exactly, in every respect, with those he had written on the former.

The method of M. Guénon has not the merit of being a brilliant theory. It rests upon facts and long experience. It is only after repeated trials, and twenty-five years of toilsome researches, that its author has accomplished the task of establishing it.

We are of opinion, Gentlemen, that M. Guénon ought to be encouraged by you in the publication of a system which appears to us destined to exercise a happy influence on the advancement of one of the most important branches of rural economy. What immense advantages may there not result, particularly in Auvergne, where the raising of Cattle and the manufacture of cheese constitute the chief branch of industry, from a method which should enable us to distinguish, in a sure way, between good and bad Cows? By applying this system to Calves and to Bulls, our stock would rapidly be raised to a high point of excellence, and we should soon have in our mountains none but Cows of the best kind.

In view of all these considerations, your Committee have the honor to propose—

1st. *That there be awarded to M. Guénon a gold medal, with the effigy of* OLIVIER *de* SERRES.

2d. *That he be proclaimed a Corresponding member of the Society.*

3d. *To subscribe for twenty-five copies of his work, for distribution among the Sub-Societies of the department.*

4th. *To cause this Report to be inserted in the* AGRICULTURAL PROPAGATOR, and to transmit a copy to all the Prefects and Agricultural Societies of France.

[Signed] COUNT SAIGNES,
G. DE LALAUBIE,
GENERAL BARON HUGONET,
V. DE PRUINES, *Reporter of the Committee.*

Note.—At the same sitting, the recommendations of the Committee were adopted by the Central Society of Agriculture of Cantal.

With this highly flattering testimony in hand, I now come forward to publish the result of my silent meditations and toilsome studies. Every one will be able, with the aid of the lithographic drawings attached to the work, readily to recognize the distinctive marks of the animal examined by him. These marks are visible upon the posterior part of every Cow, in the space embraced between the

* See the names of the several classes, in the chapter *On the different kinds of Cows.*

udder and the vulva. They consist of a kind of escutcheons of various shapes and sizes, formed by the hair growing in different directions, and bounded by lines where these different growths of hair meet. The varieties of these escutcheons mark the different classes and orders of Cows.

It is upon these signs that every one may rest his judgment, by attending to the remarks contained in the body of the work upon the different kinds of Cows.—They are what every body has seen, or been able to see; but what no one has attended to. For myself, I have persevered through all obstacles: neither fruitless expenses, which were enormous for one of my means; nor the malice of the malevolent; nor the cold reception of the indifferent; nor the smile of incredulity; nothing has been able to damp my zeal. Strong in my conviction, I have been sustained by it through all my trials; and it has always raised me up when all conspired to depress me.

CHAPTER II.

ON THE DIFFERENT KINDS OF COWS.

§ 1. Genuine Cows.

I HAVE, as I said, established a classification of Cows; and the reader will have become aware how much time it must have cost me to arrive at this classification. Neither the language of Science nor its method is to be expected in my work: I have had no other instructor than myself, and Nature has been my only book. I am not pretending to write a treatise of Natural History; I am only giving to the public the result of my experience and observation. The suggestions of my own mind at the different stages of my discovery have been my only guides. In following up my observations, it was requisite that order should be established among the facts noticed by me and the thoughts to which they gave rise. To designate the various figures of the escutcheons of the several classes, new names were necessary. This order and this nomenclature are of my own invention.—For the purpose of coining French names, I have not ransacked Greek or Latin vocabularies; I have adopted those which suggested themselves as naturally expressive. If they be not formed after the rules of etymology, they are at least such as every one can seize the meaning of; and my book being destined chiefly for that class of men who are for the most part strangers to belles-lettres, it will possess in their eyes the merit of not disguising things under the words used to dignify them.

I divide Cows into *Eight* CLASSES or families; and these classes each into eight ORDERS. In each class, I distinguish three different SIZES; the *High*, the *Low* and the *Medium*. This classification embraces all kinds of Cows known to me; every individual being assignable to some one of these eight classes, and to some one of the orders comprised in it. According to the *Class*, the *Order*, and the *Size* of an animal, is her yield of milk: this being always found to correspond with the escutcheon characteristic of each class; some one of which escutcheons, is recognized in every Cow, more or less perfectly defined and free from blemish, according to the degree in which she approaches to the perfection of her class. This mark consists, as I have said, of the figure, on the posterior parts of the animal, formed by the meeting of the hair that grows or points in different direc-

tions; the line of junction of these different growths of hair constituting the outline of the figure or escutcheon. Here are the names of the eight classes:

1st Class....	THE FLANDERS COW.	5th Class....	THE DEMIJOHN COW.
2d " .... "	SELVAGE COW.	6th " .... "	SQUARE SCUTCHEON COW.
3d " .... "	CURVELINE COW.	7th " .... "	LIMOUSINE COW.
4th " .... "	BICORN COW.	8th " .... "	HORIZONTAL CUT COW.

By means of the following description of the several Classes and Orders, aided by the engraved prints attached to the work, every person can assign any Cow examined by him to her appropriate place in the classification, and consequently form an accurate judgment in regard to the maximum quantity of milk which she can yield daily, and also to the time during which this yield will remain at its maximum. It results from the numerous and oft-repeated tests to which this method of judging has been subjected, that the yield may sometimes vary from what I have adopted as the standard point; because, as I have stated, the climate, the food and the season do exercise an influence upon it. But there is one thing which never varies, which always holds good, at all times and in all places: in every one of the eight classes, the Cows of the higher orders are always the best, and those of the lower orders always the least good; that is to say, the two highest orders are always the most productive, the third and fourth orders are tolerably good, and the four others go on diminishing to the last, which may be looked upon as nullities so far as regards milk.

§ 2. Bastard Cows.

Before entering upon a detailed description of the classes severally, it is important that the reader be reminded that each class has its *Bastards;* that is to say, Cows which, although bearing a perfect resemblance to the others, do nevertheless differ from them in their yield. This resemblance deceives the most practiced eye, and is the source of many mistakes and of serious losses. In order, therefore, that the reader may be enabled to avail himself of my method, I must make him acquainted with the marks by which the bastards of each class are distinguished.

I have adopted the word *Bastard* to denote those Cows which give milk only so long as they have not been got with calf anew; and which, upon this happening, go dry, all of a sudden or in the course of a few days. Cows of this kind are found in each of the classes, and in every order of the class. Some of them are great milkers; but so soon as they have got with calf, their milk is gone. Others present the most promising appearance, but their yield is very insignificant. Cases of this kind occur every day; the most skillful judges find themselves mistaken.

When it happens that a Cow that was giving a plenty of milk loses it, all of a sudden, upon being got with calf, people do not know how to account for this loss of her milk; various causes are assigned for it, not one of which is the true one. It does not depend, as some suppose, upon the will of the animal about letting down her milk; it so happens simply because she is born so, because she is so formed and constituted.

Now there are characteristic signs, also, whereby the Bastard Cows in each of the classes and orders may be known. They are distinguished by the lines of ascending and descending hair in their escutcheon. These escutcheons are put before the reader's eyes in the Ninth plate, the drawings of which are, like the others, from nature.

In general, these Bastard Cows conceive with great facility the first time they come in heat, if they be then put to the bull. But they do not continue to give milk in any quantity; they cannot furnish enough even for the calf. Consequently if a Cow of this kind be put to the bull, it becomes necessary to wean her calf, and it falls away so as to be unfit for the butcher.

Among the Bastard Cows, some yield an oily and creamy milk; others but a serous milk: some give a great deal; others but little. In them, as in the genuine Cow of the same classes, the yield varies with the size; and the color of the dandruf is the same.

Generally speaking, the flow of milk is at its maximum during the first eight days after calving; but the milk is of a bad quality. After this period it undergoes a slight diminution; but its flow being once regularly established, the quantity remains constant until the Cow has conceived anew. At this period, it undergoes another diminution, in all the Classes and Orders; but more or less according to the Class and Order. We are now to enter into a more particular explanation of this.

CLASS I.

The Flanders Cow.

The reader is already apprised that, in the denominations which have suggested themselves to me, he is not to expect etymological or scientific combinations. The names which I have given to my classes are altogether arbitrary, and have reference to my own notions solely. I have adopted the above appellation for the Cows of my first class, which are the best in our country, because Cows of the Flemish breed, extensively known for their valuable qualities, possess, generally speaking, the escutcheon which is characteristic of this first class. These Cows, which I call the *Flanders* Cows, are the best milkers; they are also, among us, the most scarce. In this class, as in all the others, each order is distinguished by a particular modification of the general mark or escutcheon of the class; and there is a corresponding difference in the yield of milk, in the proportions which I am about to specify.

With respect to *size*, I call a Cow *high* when she weighs from five to six hundred pounds; of *medium hight*, when she weighs from three to four hundred pounds; *low*, when she weighs from one to two hundred pounds.*

HIGH COW.... First Order.

Cows of the First Order of this class and this size yield, whilst at the hight of their flow, (that is to say, from the time of calving until they are got with calf again) *twenty litres*† of milk a day. After they have conceived anew, the quantity of milk diminishes little by little; but they continue to give milk until they are eight months gone with calf: indeed Cows of this order never go dry, if we choose to milk them all the time.

Cows of this Class and Order are known by their having a delicate udder, covered with a fine, downy hair growing upward from between the four teats. This downy growth extends upward, over the hinder part of the udder and the region above it, blending itself with a similar growth (of hair pointing upward) which, beginning on the legs, a little above the hock joint, covers the inner sur-

* This is French weight. To reduce it to English avoirdupois, add 8 pounds to every 100.

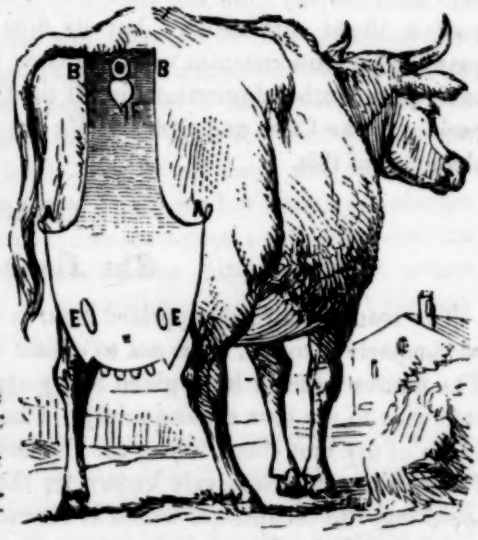
† The *litre* is one of the modern French measures, containing about 2¼ English wine pints

Table I.....Class 1.

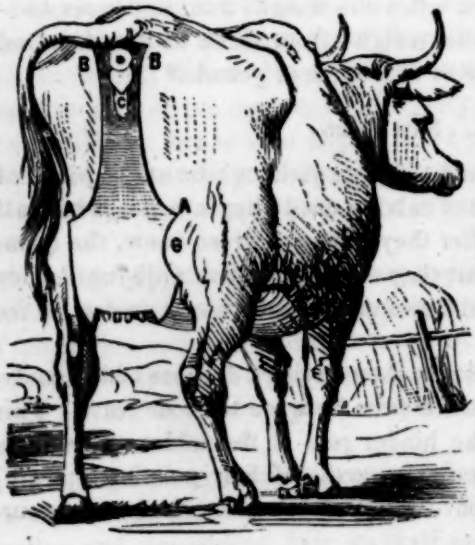
THE FLANDERS COW.

Order 1st.

Order 2d.



Order 5th.



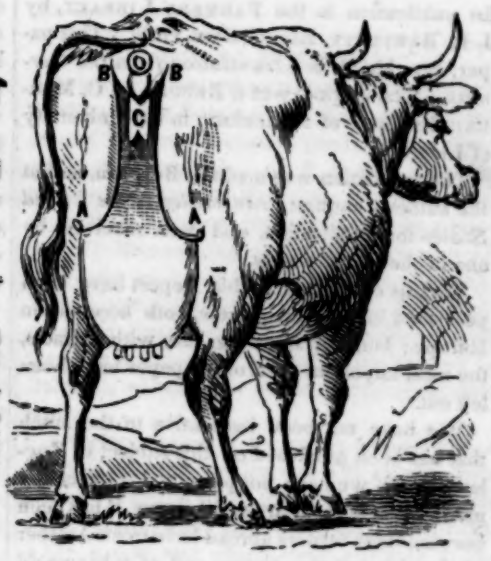
Order 6th.

Table I.....Class 1.

THE FLANDERS COW.

Order 3d.

Order 4th.



Order 7th.

Order 8th.

THE POTATO DISEASE.

AN AUTHENTIC AND VALUABLE MEMOIR ON THE POTATO DISEASE.

TRANSLATED FROM THE GERMAN, AND SENT BY THE TRANSLATOR TO BE PUBLISHED IN THE UNITED STATES.

THE following Essay was kindly presented for publication in the FARMERS' LIBRARY, by J. R. BARTLETT, Esq. of New-York. This paper, says Mr. B. is *a translation from the German.* The original was a REPORT by C. MORREN, Professor of Agriculture in the University of Liege.

The translation was made in Belgium, and at the author's request, *transmitted to the United States* for publication, and was received by one of the late steamers.

Various extracts from this Report have been published in the newspapers, both here and in Europe; but, as is often the case with extracts, the most important parts of the paper have been left out.

We have not been inattentive to the much that has been published on this subject in England, and if we have not permitted it to occupy more space in the Farmers' Library, it has been because these writers abroad have treated rather of the signs of the disease and of what could now be done to turn the diseased root to account, than of the cause of the malady, and the means of preventing it.

The first thing to be noted is, that while British writers ascribe the cause to atmospheric influence, or rather to the cold and variable summer in Europe, we have had an uncommonly dry and hot season here, with the disease in many places as fully developed; and, moreover, they give directions which fully admit the existence of the fungus. In their early Report, they decry the use of salt, as accelerating the disease, and yet they more recently recommend the use of it to stay its ravages. It is to be noted that Professor LINDLEY had committed himself in the Gardener's Chronicle, in an early period of the discussion, in favor of *atmospheric influence.*

Three instances have been lately published in the *New-England Farmer,* where, in parallel circumstances, *lime* and *salt* have saved that portion of the crop dressed with them, while the rest of it perished.

We know of no one who has so carefully studied this subject, with equal facilities and capacity to investigate it thoroughly, as that accomplished agricultural chemist and horticulturist, J. E. TESCHEMACHER, Esq. of Boston, who has satisfied himself that *fungus* is the cause of the disease. Several letters, as we understand, have been received by him from England, stating that those who could not find the minute fungus with common microscopes, and hence doubted its existence, have since clearly distinguished it by the use of instruments of higher powers, and are convinced of its existence being the cause of the disease. LIEBIG'S expositions are purely chemical, and may just as well apply to the juice of the vegetable fungus, as to the juice of the vegetable potato. In Mr. Teschemacher's letter to the "New-England Farmer," Oct. 1844, he stated that the grains of starch were *uninjured* by the fungus. This, in 1845, was made a *great* discovery by Mr. Herapath, in England. In a few numbers subsequent, but in 1844, of same paper, Mr. T. states that, in all probability, the spores attached themselves to the potato-stalk, and so passed down to the tuber; and we have understood that, in his paper to the New York State Agricultural Society, in 1844—which, it is to be lamented, has never seen the light—he states that before the microscope the appearance does not agree with the fungus *Erysibe,* the cause of the potato scab. MORREN says it is a *Botrydis*—in which, doubtless, he is right. In the same paper, as we have been told, Mr. T. enumerates sulphate of copper, as well as salt and lime, as preventives. So does M. Morren. In the same paper, and in the "New-England Farmer," Mr. Teschemacher advocates analyses of the juices of various potatoes, to see if anything can be found which, in one kind of juice, will be found less favorable to the vegetation of the fungus than in another—with the view of introducing salt *(chlorine of sodium)* into these juices, through the absorption of the roots, by spreading it on the ground. This is the chemical part of the subject. We recapitulate these facts for the rightful and legitimate purpose of showing that, by a public spirited and enlightened study of the subject, in 1844, Mr. Teschemacher, of Boston, had made and promulgated the same views which, in 1845, were taken by the scientific men in Europe; and which concurring testimony seems to confirm, and to give solid ground for recommending the application

of salt and lime to the soil, as well as to the potato itself. Those who, in the zeal of the true naturalist, make such laborious and pains-taking investigations for the benefit of society, may be, like Mr. T., indifferent to the credit of first discovery, which, to say the least, is their fair reward; but that only enhances the obligation of the impartial friends of Science everywhere to see that "justice be done, though the heavens fall."

Those most conversant with this subject, with whom we have conversed, are of opinion that potatoes should now be sprinkled with lime, and again when they are planted. Salt, they think, too, should also be applied to the soil. A gentleman near Boston planted five acres without manure, and one acre with *guano*. The seed all came from "down East," but from different places. The five acres are destroyed by the disease—the one acre is safe. Yet this experiment is not *absolutely* decisive—since, as the seed came from various places, it might be that those planted on the five acres were diseased, and the other not; but that is not probable.

The reader will observe that, throughout M. Morren's paper, he does not express any *doubt*, but says it *is* thus and so; and, from his character and the station he fills, we may be assured that he would not stake his reputation on any matter of fact of which he did not feel certain.—How can it, on reflection, be owing to atmospheric influences, since the disease has propagated under very various states thereof? At the same time, a moist atmosphere is known to be favorable to the growth of most *fungi*. But where no spores exist, it is believed no atmosphere can produce them.

It is a gratifying evidence of the earnestness with which the friends of Agriculture are pushing their inquiries, and enlightening its path with the lights of Science, that the Maryland Agricultural Club has committed this subject to the scrutiny of competent investigators.

It would seem by the following, from a late London Gardener's Chronicle, that the disease is prevalent, and believed not to be new, in its indigenous regions of South America:

"POTATO DISEASE IN CENTRAL AMERICA.—At the Academy of Sciences of Paris, Nov. 17, 1845, Monsieur Boussingault communicated an extract from a letter from M. Joachim Acosta, of Bogota, relative to the Potato disease. It appears from this letter that the malady is very common on the table land of Bogota, that it is destructive in wet seasons, or even every year in damp spots. This does not prevent the tubers being used, when the affected part has been removed. It is known that Potatoes are indigenous to this plain. M. Acosta does not doubt that the malady has always been known there, since it excites no alarm in the Indians, who live principally on Potatoes. M. Boussingault properly remarks that in these countries, where cultivation continues without intermission during the year, and where the tubers are consumed without the necessity of storing them, there is no fear, as with us, of a bad harvest, because it may be replaced immediately by a good one. With us, where the culture is annual, and must be preserved through winter, it is natural that we should be more concerned in a malady which may destroy the resources of a whole year.—*M. J. B.*"

So much by way of introduction to the valuable memoir from Professor MORREN—for which we return, in advance, the thanks of the agricultural community to the gentleman who has had the kindness to communicate it for publication in this journal.

POTATO SICKNESS.

IT is known that a general malady has stricken the Potatoes in Belgium, and it appears that the crop of this most necessary production is there much compromised. As it is said that this malady threatens also the Potato crop in France, we believe it right to reproduce here the advice that Mr. Morren, Professor of Agriculture at the University of Liege, has addressed to the public in a letter that we find in "The Independance," of Brussels. Mr. Morren, after stating that this evil has for several years existed in Belgium, although in a less alarming degree, adds:

"The true cause of the evil is a mushroom, a mouldiness, that the learned will class in their genus 'botrydis,' but that the agriculturists hardly distinguish, and which they call a burn, a fire, a stain, and which some attribute to humidity, others to dryness; some to a bad wind come from France, others to insects, &c. &c. It is not, however, indifferent to us to know the true cause of the phenomenon, for this knowledge will put us in the way of diminishing the scourge, and possibly of destroying it.

"For some time I have followed every day, and step by step, the progress of the evil, in observing several fields of Potatoes. The malady commences decidedly in the upper part of the leaves; I have even seen the flowers and fruits attacked in the first place. A part of the green tissue loses its tint and turns promptly yellow; the stain soon becomes more grey below, and it is always on the lower surface of the leaf, or on the fruit, where, a day or two after the appearance of the yellow stain, a whitish down shows itself. The microscope discovers then that this down proceeds from a mushroom which grows between the numerous hairs which garnish the bottom of the leaf of the Potato. This mushroom is of an extreme tenacity; but it breeds and reproduces itself by thousands. Its stems are formed of little straight and partitioned threads, which have at their summit one or several branches, always divided in two, and at the end of these branches reproducing bodies

develop themselves which have the form of eggs. but which have not more than the hundredth part, or even less, of a millimeter in size. I may be told it is a very small body to commit ravages so great; but I answer, the itch is not the less to be feared because the animalcule which produces it is a microscopic being.

"After the formation of the yellow spot, and the development of the 'botrydis' on the leaf of the Potato, the stem receives the deleterious influences. Here and there its surface becomes brown, blackens, and when the phases of the evil are followed with the microscope, it is soon perceived that the stem is attacked through the bark. The morbid agent carries its action from the bark to the skin, and although this does not always offer mushrooms, it is not the less stricken with death; for to any one that has some notions of vegetable physiology these effects easily explain themselves. The sap modified into living juice, into vegetable blood, forms itself in the leaf, and then descends into the stem and the root, by the bark. Here this sap is sick, modified, it carries the poison of the leaf into the stem, and this perishes. Indeed, so soon as the black spots declare themselves on the stems the leaves become dry and die—blackened and stricken with death by a venomous mushroom, they fall, unfortunately, to propagate the source of the scourge, or to deposit its germ in the earth. I will soon indicate the means which should be taken, to prevent this fatal communication.

"The infection soon descends into the tubercle itself. If the evil follows its course, the tubercle immediately gangrenes. A Potato is not a root, but a branch; it follows from that, that a tubercle possesses a marrow which is the eatable part to be preferred, and a distinct bark. Between the marrow and the bark is found a zone of vessels which represents wood. One can easily understand this structure by cutting a thin slice of Potato and placing it between the eye and the light. Now the infection attacks the part which receives the descending sap, that part where the morbid agent has itself descended. Upon a Potato attacked, one perceives a series of livid spots, brown or yellow, sometimes grey or blackened—a series which extends itself throughout the woody zone. In following the progress of the evil over a great number of spoiled tubercles, I could see how the disease, increasing by small degrees, finishes by reaching the heart itself of the Potato, and corrupts it entirely. The skin of the sick Potato easily detaches itself; the flesh no longer cracks under the knife; a discolored flacidity, a fade, and, later, an animal smell, analogous to that of mushroom freshly cut, declares itself and carries off the heart. The animals even refuse to eat a food which may be regarded to be quite as injurious as deteriorated mushrooms themselves.

"So soon as the Potato is gangrened within, that is, in its cortical part, but a few days, three at the most, are sufficient for the mushroom (the 'botrydis') to show itself without. This white efflorescence is seen to declare itself in the eyes of the tubercles, and then extend itself like light, white flakes, at first upon a rounded surface, but which finishes by invading the whole tubercle. The Potato is then entirely lost.

"The source of the evil being known, all the attention of the cultivator should be directed toward the destruction of the mushroom; for it is unfortunately too true that the blight, the rust, and all the race of parasites once introduced into the country, they remain there and propagate themselves. This year the epidemic has been general; every where the germs of it exist; millions of that which propagate it, if their number be not diminished, will attack the plants the approaching year, and it will then be more difficult than ever to eradicate the plague, to do which it is essential to adopt the following means:

"1st. When the leaves are lost they must be collected as quickly as possible, and burnt upon the spot, without being transported to a distance. The ashes may be spread upon the soil. In collecting them they must be shaken as little as possible. I have seen, with regret, the farmers collect the sick leaves to preserve them in a pile in the field, or to cast them over the hedges. This is to preserve the plague for the next year.

"2d. When certain varieties of the Potato, or certain localities are free from the calamity at the time of the crop, it is always prudent to burn the leaves; for a field may appear clear of the 'botrydis' when it is not so. Several leaves are attacked; these leaves throw out the seeds of the disease upon the tubercles, which, preserved as seed will preserve the disease the next year.

"3d. If the tubercles are themselves attacked, it is essential to take them out of the earth to make a prompt choice out of them, which is easy, for habit soon enables one to recognize the spoiled tubercles from those which are not so. The sound tubercles ought to be used as soon as possible, for they are not injurious up to the moment the bark becomes yellow. The smell alone is sufficient to detect the development of the malady. The sick tubercles should be burned.

"4th. To obviate the sorrowful consequences of a crop which will be always reduced either a half, or a third, or even less, than an ordinary crop, it would be important to follow, in our country, the method practiced in Scotland in cultivating Potatoes during winter.

"5th. Since it is very probable that the seed-tubercles that may escape from the present crop will be infected with the germ of the mushroom, it would be well if by the intervention of the Government or commerce the farmers had at their disposal pure seed-tubercles, that were not infected; and for this purpose, the Potatoes of Pennsylvania or Ireland would suit us exceedingly well. The plague is not known in those two countries. We must distrust the Potatoes of Germany, where the dry gangrene, the shriveling (*la crispure*) and the ulceration of the tubercle is but too common; and we might take advantage of this importation to endow the country with those varieties of Potatoes which are most congenial to our soil.

"6th. If the farmers are obstinate in employing, as seed, tubercles of this year's crop, it will be necessary to subject them to liming, as is done with wheat, rye, oats, and all plants which are subject to be invaded by parasites. The liming ought to be done by immersing the tubercles, because the study of the habits of the 'botrydis' shows it is the eye, the deepest point of the Potato, which is attacked. The limed water should then bathe this leprous eye. 25 kilog. of lime, ¼ lb. of the sulphate of copper, and 3 kilog. of marine salt, to 125 litres of water, constitute a liming of which the useful effects have been acknowledged by a great number of instructed cultivators.

"7th. In the plantations, either of the winter of 1845 or the spring of 1846, it is essential to plant, in Potatoes, parcels of ground as distant as possible from those infected this year, for it is easily understood that the chance of transmission, by the preservation in the soil, of the seed of the mushroom, is much greater in plantings that approach each other than if they were made at a distance.

"8th. When the Counselor de Martens visited Belgium, and inquired in our different provinces the state of our Potatoes, he informed me, in one of his interesting conversations, that the farmers on the borders of the Rhine had remarked that the dry gangrene attacked oftener the Potato plantations made in the afternoon, than those made in the morning; and he explained this phenomenon, which at first appeared singular, by a very simple fact. When the sun has passed the meridian, the heat of the strata of air is at its maximum: this heat accelerates the vitality of plants; that which propagates them flies more rapidly in a dilated air; the insects, in their flight, disperse with facility a mass of little bodies, of which the air is the vehicle; and the dissemination of their germs is then also at its maximum. The farmer is plunged in this atmosphere, and he causes to pass through it the Potatoes which he plants; it attaches itself to the seed, and is sown with it; and that happens here which occurs to the grain not limed—the poison is sown and grows with the plant, to attack and kill it at a later period. From which arises the advice we give to the farmers, to plant their Potatoes in the morning.

"9th. The employment of lime and marine salt, mixed with a small quantity of the sulphate of copper, is, as I have said, of a recognized efficacy in the destruction of the germs of parasite plants; consequently, to powder with these mixed substances the soil which has been planted with sick Potatoes, is an operation calculated to destroy the germ of the scourge, and cannot be too strongly recommended everywhere.

"10th. The preservation of the Potatoes that have escaped being attacked this year, in cellars, &c. will certainly deposit in these places the germ of the mushroom. To cleanse these cellars and whitewash them with lime are excellent means of destroying the germs, and to spread lime and pounded coal on the places where the Potatoes have been deposited, will finish the series of proceedings we consider the most rational and the most certain to destroy, if it be possible, the evil at its root.

[Signed] "CH. MORREN,

"Member of the Royal Academy of Sciences, and Professor of Agriculture and Economy 'forestiere' at the University of Liege."

Since the receipt of the above we have been favored with a copy of the following. To the American readers of this journal it is superfluous to say that Mr. Gowen's zeal, intelligence, close attention and success as a practical farmer, entitle his judgment to high respect, and well account for the British Consul's application to him for the result of his observations on this important subject.

Correspondence between Mr. PETER, *British Consul at Philadelphia, and Mr.* GOWEN, *of Mount Airy, on the subject of the Potato Rot.*

MR. GOWEN'S REPLY.

MT. AIRY, 29th Dec. 1845.

My Dear Sir: Your note on the subject of "the Potato Rot," dated Saturday, did not reach me at Mount Airy, Sunday intervening, till this morning, Monday. It would give me pleasure to oblige you fully in this matter, did time permit to go more into detail; but the brief space allotted for a reply will compel me to be as concise as possible.

I hold that atmospheric influence is the sole cause of the late pervading Rot in the Potato; that neither manures nor condition of soils could have produced the calamity; that animalculæ and fungi are as remote from it—the latter may in a partial manner injure a Potato plant, as they would, under peculiar circumstances, be likely to injure other plants; that the Rot *is not* epidemic; and have reason to believe that sound or *partially* sound Potatoes, taken from

a diseased crop or heap, will, if planted, produce healthy, sound Potatoes in the absence of the cause which injured them the previous season.

I would therefore encourage the farmers to cultivate their Potatoes as formerly, choosing the soils and applying the manures which hitherto were found best adapted to their culture; forgetting or overlooking the Rot altogether, and disregarding the nostrums recommended for its prevention: the Potato won't bear doctoring.

The weather which produces Rot is either a severe, continuous drouth of some weeks' standing, thereby preventing the natural growth and maturity of the Potato, for the want of moisture, or very hot weather, bringing the Potato to a premature ripeness, succeeded by wet, sultry weather, unnaturally *spring-like*, which provokes the tubers to perform the functions of seed, thereby dissolving the connection between them and their vines: the vines die; the roots undergo an incipient fermentation preparatory to decomposition; the operation of budding or growing is checked by the natural autumnal temperature that at length prevails, which arrests the Potato in its work of producing, and hence its deterioration. The latter condition of the weather is the prevailing cause of the Rot.

As to a severe and continuous drouth, my own experience points to that of 1838. That season I had a five-acre patch in with Potatoes, which did not pay for the trouble of taking them out of the ground. They were small, ill-shaped, bad-tasted, poisonous, spotted and black-hearted, and rotted in cellar. Potatoes that season sold as high as $1 25 and $1 50 per bushel—not a bushel of good Potatoes in March, except those imported. Then as to dry, hot weather, succeeded by wet, close, over spring-like temperature, the season of 1843 is in point. I took more than common pains that year to produce a surpassing yield, equal, at least, to my famous crop of the preceding year, which was over 440 bushels to the acre—field culture. My seed was in part from those fine Potatoes, and in part from some very large, sound Potatoes imported from the State of Maine. On taking out the crop in October, the whole was found to be very badly diseased. The weather from the latter part of June till the beginning of September was mainly hot, occasionally very hot, and dry. September set in with warm rains, thunder-storms and gusts; the moisture and closeness unprecedented; fruit-trees blossomed, as well as many flowering-trees and shrubs; I recollect making a large collection of flowers from the magnolias, some of which I sent to the Editor of the "Pennsylvania Inquirer." My Potato vines looked green and healthy, when all of a sudden they changed color, drooped and died. I think if I had taken out the Potatoes at that juncture they would have proved comparatively good; but they were permitted to remain quite a month after, when they were found badly rotted, tainted, and almost worthless.

Now, then, as to the epidemic. In 1844, I planted some four to five acres of Potatoes, *the seed of which was principally culled from the diseased crop of* 1843. I planted, also, at the same time, in the same field, other seed of very sound potatoes brought from Maine; they all did equally well; I *could discover no difference*; the crop was a very fair one, and the quality unexceptionable in every respect. I do not mean by this to encourage the planting of diseased or doubtful Potatoes. It is safer to plant sound and perfect ones; but I am strong in the opinion that there is no danger of a diseased or tainted Potato producing a diseased or tainted Potato. It may, from its want of vitality, be very unproductive, make feeble shoots, the same as decayed Potatoes from on shipboard after a long voyage, the heat and moisture of the vessel's hold having caused them to send out enormous shoots, impairing their vigor, and producing Rot. Such Potatoes, when planted, never produce well as to size and quantity; but I have yet to learn that they ever produced a diseased Potato.

Much has been said of Potatoes becoming feeble and sickly from long and constant planting: there may be something in this; time will not permit me to examine it now. I have, however, numerous sorts of seedlings produced from the apples of my very fine crop of 1842. I shall take occasion to present you with a few to send to some of your friends abroad.

By this you will see that I can offer no remedy or preventive for the Rot. He that tempers the winds to the shorn lamb, can only control it. Should it again visit us, we can only exercise our best judgment by taking out the Potatoes early—as soon as they exhibit signs of decay—laying them in thin layers in dry, cool situations, or otherwise, as circumstances may justify. Let the farmers go on and plant in confidence, as their best experience may teach, trusting for an abundant yield to that Providence who sendeth the early and the latter rain.

Very respectfully your friend and ob't serv't.
(Signed) JAMES GOWEN.

WILLIAM PETER, Esq. Her Britannic Majesty's Consul, Philadelphia.

COLORED INKS.—Inks of various colors may be made from a strong decoction of the ingredients used in dyeing, mixed with a little alum and gum arabic. Any of the ordinary water-color cakes employed in drawing, diffused through water, may also be used for colored inks. [Cooley's Cyclo. of Prac. Receipts.

CHARACTERISTICS OF DIFFERENT BREEDS OF HORSES, BY HON. ZADOCK PRATT.

FARMERS RECOMMENDED TO KEEP EXACT ACCOUNTS.

PRATTSVILLE, GREENE CO., N. Y., HORSES AND PENNSYLVANIA CONESTOGAS COMPARED.

We do not know when we have seen the characteristics of Horses for different purposes more briefly and at the same time comprehensively and accurately described than by Hon. Zadock Pratt, in the following extracts from his address lately delivered to the Greene County Agricultural Society of which he is the President. But it is not so much to commend these extracts in that light, as to make them answer another purpose, that we have cut them out of the midst of a variety of topics, presented by this address with the force of truth and the plainness that belongs to and best becomes *the working man.*

The point to which we would particularly call the attention of the young Farmer, is the ease and the confidence with which he states the *exact cost per hundred* of transporting nearly two and a half millions of pounds of leather! What an example here is of *system.* How forcibly it illustrates what we have so often inculcated—the *propriety of keeping exact accounts of every cent of outlay and income on a Farm.* Let it not be said that to do so, would be difficult and troublesome if not impossible. To the slothful and indolent all things are difficult; a lion is always standing in their path. So Mr. Pratt might have said the same, but had he *acted* upon that principle, how different might have been the result even of his life of personal industry? Instead of ample independence, and the power and the *will* to be useful to his fellow men and his country; he might, *without system and without accounts,* have closed a career of care and toil, in penury and wretchedness.—Without them his business might have sprung aleak in divers places, only to be discovered when his bark was in a sinking condition! Instead of that, every item, from the purchase of the raw hide to the sale of the perfect leather is noted, and posted up, as accurately and minutely as in the most systematic mercantile establishment. If a screw gets loose in his business, it is at once discovered and put right, and why should not every farmer keep, substantially at least, a full *view of profit and loss!* Why should he not be able to tell how much a bushel of wheat or a pound of tobacco costs, as well as Mr. Pratt can tell the cost of a single pound of leather—ay, even to a cent—how much to haul it, though that be done, as the farmer's wheat is transported, with his own wagon and team? For, after all, a farm is no less a manufactory than a tannery is! The tanner puts in his land, his buildings, his vat, his hides, his bark-mill, his bark, his horses; then the cost of their food, the smith's work, his hired labor, and *all that is outlaid,* until the *leather is sold and the balance struck.* The farmer has in like manner a certain amount of capital inherited or invested (for it is the same thing as a matter of account) in lands, horses, hands, lime, plaster, seed, manure, expense of subsisting his force, cost and wear and tear of machinery, implements, horses, mules, oxen—and all that is employed in *manufacturing* hay, or grain, or tobacco, or rice, or cotton, or sugar, or hops, or apples, or hemp, until at last *the produce or manufacture, like the leather, is sold, and the balance struck!* Why then are not accounts as necessary to the farmer or the planter, as to Zadock Pratt and Company? who, if you were to tell them they were not to *keep accounts,* however flattering of profit the chances might seem to be, would not venture to proceed for a *single day!* But, keeping exact accounts, watching for leaks, and working by a system that cannot fail to detect them as soon as they occur, behold the result! His sagacity discovers a manufacturing water-power which had slumbered for ages, unobserved and neglected, in the solitude of Nature, like granite in the yet unopened quarry. With confident forecast he takes hold of it and wakes the sleeping giant into action, taking care to have him well harnessed and under control, as the Gaucho seizes and tames the wildest horse of the pampas. Driving that power with industry and exactness, it has grown into a manufactory that has no equal of its kind—the nucleus of a thriving and prosperous and moral community. But this could never have been done, by industry alone, without system, and that security which system only can give. Of this large establishment, a model in its way, for the benefit of the rising generation, we may hereafter give a more particular account.

These are the sort of men who multiply the products of labor by offering rewards to industry, and who incite others to the practice of systematic diligence by their own successful example. Such men are of more real advantage to their country than an army—of idle blood-suckers and intriguing, selfish demagogues.

"Of all the animals created for the use of man,

none has been the subject of so much observation and esteem as the Horse. In their native wilds, Nature forms them into herds and groups, and gives them in command of the strongest and fleetest; and by this and other wise arrangements, of which only God is capable, guards the species against general degeneracy. The same kind care has been shown in special provision for the security of every race of animals; but when this security is taken away, and they are brought under the dominion and management of man, the most skillful attention is required in changing the general character of the species, and producing and improving distinct breeds, each adapted to its own specific purpose. It is not every breed that is suited to every locality; for climate and the face and food of different countries will modify the shapes and qualities, not only of the domestic animals, but of the human species: the raw-boned, industrious, hardy and temperate man of the north becomes enervated and indolent both in the mental and physical constitution and energies, in tropical latitudes where he reposes in the lap of luxury, enjoying without exertion the abundance which Nature lavishes around him.

"The horse best fitted to travel in the sun and sands of the south, is the descendant of the small, hard-boned, light-footed Arabian, with his high courage and silken coat; while grain-growing Pennsylvania and Ohio, with their cumbrous wagons, prefer to use a heavy, corn-fed breed, that will throw a greater weight upon the collar. The north, again, is better served by a more compact and active race, of middle size, endowed with much more strength in proportion to their weight, and greater powers of endurance; who bravely champ the bit and nobly strain to the load with lion-like vigor; rejoicing at toil, and answering to the driver's voice with proud step and martial air, as if it was the trumpet calling them to battle. Thus the wants and peculiarities—the soil, climate and uses of each district—require and produce that peculiar breed which is best suited to itself. What better stock do we need than such as can be bred from the best of those we already have. The teams of Z. Pratt & Co. composed of a single span (natives of our own region), are in the habit of drawing from Catskill, over the mountains to Prattsville, and back, loads of hides and leather of from thirty to fifty, and even sixty hundred weight, each wagon or sleigh not included, the distance being thirty-seven miles, and requiring three days to go and come.

"The quantity thus transported within the year is nearly two and a half millions of pounds, and the expenses the last season, including all risks and charges, was only thirteen cents a hundred. During twenty years of this service, which I make bold to assert has not been equaled by horses of any other district or county on the globe, not a horse has been injured, in the hands of a careful driver, and to the honor of the county be it said that we have never lost a hide or side of leather, of the million and one-half thus transported."

The reader may be gratified in having the means of comparing these *Prattsville, Greene Co. New-York* Horses with the *Pennsylvania Conestogas*. It will be seen that two of the former haul from five to six thousand weight twenty-four miles a day, while six of the latter make but sixteen miles a day with from six to eight thousand. Doubtless, however, the wagons in the latter case are much heavier, and the roads not nearly so good. But the reader must make his own comparison. The following is a letter from DAVID AGNEW, Esq. the excellent Postmaster of Wheeling, in reply to a letter from Mr. SKINNER, then Assistant Postmaster General. We find it in one of the works edited by Mr. S. for LEA & BLANCHARD of Philadelphia, in an ESSAY ON THE USE OF OXEN, incorporated in the American edition of "CLATER AND YOUATT'S CATTLE DOCTOR, by SKINNER:"

WHEELING, Nov. 23d, 1843.

J. S. SKINNER, Esq.

Dear Sir: Your favor requesting me to obtain information respecting horses, wagons, &c. was received in due course of mail; but as I was just leaving for Pittsburgh, I was compelled to defer answering until my return. I conferred with several wagoners, and give below the result of their united opinions.

Respectfully, your ob't serv't, DAVID AGNEW.

Question. The usual average daily travel of loaded wagons?

Answer. Sixteen miles.

Q. How many horses, and their average cost or value?

A. Six horses, average cost of each $65.

Q. The average time that horses so employed will last?

A. Seven years.

Q. At what age is it considered safe to put them to such labor?

A. Five years. Many are used at three or four years.

Q. What the average cost of shoeing each horse per annum?

A. Fifteen dollars.

Q. What is the usual feed of kind and quantity, and to how many oats is it equivalent where oats are not used?

A. Oats is the only feed in use. Four and a half bushels is allowed per day for six horses.

Q. As to hay—is it in regular use on the road, or does cut straw, or what, take the place of it?

A. Cut straw is not used. Hay is in regular use.

Q. What is the *usual* weight of their load exclusive of their wagons, and what the weight of the wagons?

A. The weight of loads varies from sixty to eighty hundred pounds; seventy hundred pounds is the usual weight; wagon's weight about 3,500 lbs.

Q. What is the first cost of wagon, harness per horse, and how long will a set of harness last?

A. A wagon of the largest size used on the national road costs $250; harness per horse $20; and will last six years.

Q. What is the cost of a wagon in proportion to what it will carry—and about how long will a wagon last, with ordinary care?

A. A wagon that will carry 3,000 lbs. costs $150; 4,000 lbs. $160; 5,000 lbs. $175; 6,000 lbs. $200; 7,000 lbs. and upward, $250; and with ordinary care will last four years.

PRESERVATION OF CABBAGES.—Cut them so that they may have about two inches of stem left below the leaves, scoop out the pith as far down as a small knife will reach, then suspend them, by means of a cord, exactly perpendicular, but in an inverted position, and daily fill up the hollow part of the stem with clean, cold water. It is stated, that by this method, cabbages, cauliflowers, broccoli, celery, &c. may be preserved for some time in a cool place; it affords an easy means of keeping a supply of green vegetables during a severe winter.

[Cooley's Cyclopædia of Practical Receipts.

ON FATTENING CATTLE,

AND THE FORMATION OF FARMERS' CLUBS.

CAN we too often urge the formation, in every Election District of the country, of *Farmers' Clubs*, for the discussion of questions of all sorts, even political questions, *immediately and obviously connected with the spread of agricultural knowledge*, and the advancement of agricultural prosperity? How easy it has ever been found when the political huckster has desired to get up an excitement, most generally with some sinister design covered by the avowal of a public purpose, to bring his clansmen around him, at some × roads tavern, to be slang-whanged. For *this* purpose, he has but to sound his whistle; alas, not the spirit-stirring whistle of *Rhoderick Dhu*—at sound of which

> "The rushes and the willow wand
> Are bristling into ax and brand,
> And every tuft of brand gives life
> To plaided warrior, arm'd for strife."

No! no! his resembles rather the insidious call of the shepherd, whose flock, gathering around him in hope of being fed, are flattered into the fold and sheared, and then turned loose again until another crop of wool has time to grow and be sheared again. Thus are good, easy Farmers gathered under the banner of party to appoint their *patriot leader* to the Legislature or to Congress, or to recommend him to some Executive office, and all this in abject compliance with the "*usages of the party.*"

We are characterizing no particular faction, but, more in sorrow than in anger, adverting to the easy excitability of the agricultural community, in matters of party politics, and the great difficulty of bringing them together for any *peculiar concern of their own*, as *Farmers*, and the extreme reluctance and parsimony with which they can bring themselves to give either time or money for the discussion of agricultural questions, the dissemination of agricultural knowledge, and for devising the ways and means of controlling and shaping the legislation of the State and the Country, for the protection and benefit of the *landed interest*. We have known farmers and planters who would cheerfully give a fat sheep or bullock, or a barrel of whisky or of flour, for a *partisan* "*treat*," who would not give $5 a year for 1200 pages of the most valuable information to be gathered in reference to their own business, from the experience and teachings of the best farmers, and the ablest men to be found, in all parts of the world! And yet there are men who will tell you that they wish their sons to be honorably distinguished for intelligence, and to keep pace, themselves, with the progress, experience and discovery, in every thing connected with their own business and sphere in life!

We know not how we could give a better idea of the utility of these Farmers' Clubs, and of the useful designs which animate and so well become them; than by copying, from the last November number of the London *Monthly Magazine*, the following account of a meeting of the "LOUGHBOROUGH AGRICULTURAL ASSOCIATION." The problem for discussion was *The Fattening of Cattle.* We transfer to our columns the observations of the several speakers, the more readily, as they seem to answer, in part at least, an inquiry lately made of us by MAJOR GWINN, the enterprising contractor for the completion of the Chesapeake and Ohio Canal, who has large possessions in the fine "glades" of Allegany County, Maryland; a region so admirably adapted to the growth of *oats and potatoes*, and replete with advantages for grazing and for sheep and dairy husbandry more eminent and less known than almost any equally eligible portion of our country. Major Gwinn's inquiries were, as to the adaptation of the crops congenial to that elevated region, to the *Fattening of Cattle and Sheep.*

True, it may be said, and by some objected, that these are *English* discussions; but the substances referred to, and the principles evolved, are of no particular nation or clime; they are of universal use and application, and in Heaven's name let us go, for knowledge, to Kamschatka or the moon, if not elsewhere to be had.

It requires but half a dozen in any county or neighborhood to form the nucleus of such a club. If the right spirit exists, it will soon be sufficiently numerous, and if it does not exist, it may be easily infused.

One thing is to be guarded against—the *cacoethes loquendi.* Too great a disposition to twaddle and to have the last word! When questions are given out, the chairman should allow no rambling from the subject in hand. One thing at a time—and for the sake of uniformity and consistency in the manner of conducting these meetings, it would be better to have a standing permanent chairman, chosen with strict reference to *his tact for the duty*,—quali-

fied by a happy union of courtesy and firmness, to maintain order, and bring back rambling debaters to the order of the day. There is nothing useful gained by picking up, at random, this gentleman or that, strangers, who happen to come in, and making them chairmen, merely for the sake of making a hit, or a sensation in the papers. But to return.

One fact alone, repeatedly stated, and universally acquiesced in, at this Loughborough meeting, would repay the time taken up in the perusal of its proceedings, if, happily, it should prompt the reading farmer, to act upon the testimony we there find, again, in favor of *protecting domestic animals from too much exposure to cold*. It is broadly asserted that the warmer they are kept, the less food they require to keep them in a certain condition. It is there shown, also, that food for fattening animals, goes farther when given of a temperature near the natural temperature of their own bodies, which is nearly 100 degrees. Here, too, we see it stated as an established fact that the *exclusion of light* favors the fattening process. All these things are essential, not only as matters of information with which every accomplished farmer should be acquainted, but as matters of practical economy in the management of his estate.—We will suppose too, for example, to carry this matter a little farther, that a gentleman farmer near Washington, is dining, we will say, with the President or the Mayor of the City, in company with his Excellency the Minister from Holland, whom we happen to know to be of enlightened. inquisitive mind, as all Ministers should be, and the question were to come up about *cheese*—(which it must be allowed would be a very natural one about the time the Port makes its appearance,) though this gentleman farmer might not choose to boast over the Dutch Minister, that ours had driven *his country cheese* out of the English Market, yet the fact that it has done so being admitted, would it not be legitimate that the American farmer, proud of his calling, should take pride in the fact being so, and in being able to answer the question *why?* which is disclosed in this *English* discussion! Are not the substance of these proceedings, and the prize essay we have before published on the manufacture of Cheshire cheese, among the sorts of knowledge that every farmer, anxious for the intellectual culture of his son, would like him to possess—even as much, if not more, than to possess it himself? He that would not, cannot have the heart of a man, much less of a *parent*. Yet how is knowledge—that sort of knowledge which should not only be a part, but is fitted to be the most delightful part of rural life—to be obtained but by *inquiry*, by *reading*, and by association with companions and men, more informed than ourselves—a thing which every young man should study to do?

It is to beget and to satisfy this thirst for knowledge, and for that true glory which knowledge and virtue only can confer, that we are devoting all our poor abilities to the "FARMERS' LIBRARY AND MONTHLY JOURNAL OF AGRICULTURE;" and as we hope for success, we would so devote, if we could afford it, a portion of all of life that remains, without any remuneration but the pleasurable consciousness of having contributed something toward the moral and intellectual improvement of a pursuit, which in more senses than one has always *supported*, for it has always been *ridden* by, every other.

Loughborough Agricultural Association.

THE quarterly meeting of this Association was held in the Wellington room, at the Plow Inn, on Thursday, the 25th September. S. B. Wilde, Esq. presided; and Mr. J. N. H. Burrows occupied the vice-chair. After the cloth had been drawn, and the usual loyal toasts were given, as also the health of the President, Chas. Wm. Packe, Esq. M. P.—

The CHAIRMAN read the circular calling the meeting, in which it was announced that the subject of discussion was, "the fattening of cattle."

Mr. RAWSON, surgeon, of Kegworth, introduced the subject. He said, there were known to chemists about fifty-six elements, of which there were only eight or nine in animals; the principal of these were oxygen, hydrogen, nitrogen, and carbon. Oxygen enters into all animal and vegetable substances, and is an essential ingredient in atmospheric air. Nitrogen has no positive properties; its object is to dilute oxygen. No animal could live in nitrogen alone. Hydrogen is sixteen times lighter than common air, and is an essential ingredient in water, and very inflammable. After an elaborate description of the various elements which enter into the animal frame, the speaker proceeded to inform the meeting what were the various uses of each. Nitrogen, he said, was the principal ingredient in flesh and muscle. Fat is composed of carbon and hydrogen. If they wished to make an animal fat for sale, or for show, they must feed it on carbonaceous food. Unripe straw is very carbonaceous. As the seed ripens it becomes less so, and not so suitable for fattening. Cows generally feed well on aftermath. Half a pound of Swede turnips contains 110 grains of nutriment, while the same weight of white turnips only contains 85 grains. The outer temperature is very important; it should be brought as nearly as possible to the temperature of the blood. The same regard to temperature is necessary with respect to a milking cow. Fat is a mere deposit, a secretion; it does not impart strength, rather the contrary. Hence we do not make a horse fat for racing, but make him display muscular power. In fattening horses for sale, carbonaceous food, young grass, oil-cake, Swede turnips, &c. should be given. In feeding for use, the carbonaceous should be mixed with an equal quantity of other kind of food.

The CHAIRMAN next proposed "The health of Mr. Bernays," which was received with applause.

Mr. A. J. BERNAYS (analytical chemist, from

Derby), then rose and said: Agriculture is a subject of such vital importance to the community at large, that I consider myself bound to attend all such meetings, where I may increase my knowledge of it; and I shall always be glad to be present at your quarterly meetings as long as I am in the neighborhood of Loughborough. We have just now heard that although 56 elements are at present known, yet only a small portion of them enter into the composition of animal and vegetable life. Of this portion, consisting of from 10 to 12, only four enter extensively into the formation of the organized portion of the vegetable and the animal. These elements arrange themselves into two distinct classes: the one class, formed by the combination of carbon, hydrogen and oxygen, in different proportions, includes what Liebig calls *the elements of respiration*. Hereto belong starch, fat, butter, sugar, gum, and alcoholic fluids. These may likewise be termed non-nitrogenized substances. The other class, formed by the combination of all the four elements, includes the *elements of nutrition*, or the *nitrogenized* constituents of food. Hereto belong vegetable and animal fibrine, caseine, albumen, and gluten. The non-nitrogenized constituents were provided for sustaining the animal heat of the body, and protecting its parts; and in so doing a provision is laid by, upon which Nature draws when the body is diseased. From their very nature they are easily destroyed by the influence of the oxygen of the air. You all know it to be a common practice to milk cows in the field, if they be at any distance from the homestead; the reason is obvious: when a cow walks a great distance without food, the oxygen of the air almost immediately begins to act upon those substances with which it can most easily combine. Such a substance is the butter in the milk: when a cow is driven home, the butter is found, in great part, to have disappeared. Again, after parturition, the milk of the cow contains only traces of butter; because, by the increased action of the muscles, a larger proportion of oxygen is taken into the system. This well known fact brings us to the subject of stall-feeding. When a cow is intended for milking, and with a view of yielding as much butter as possible, we naturally confine her. In this unnatural state, there being no call for exercise, the food taken by the animal is only in small part expended in maintaining its heat. However, we all know that confined milch cows never yielded so well-flavored butter or cheese as those which are unconfined. Cows living in a natural state eat what they *like*; stall-fed cows eat what they *get*. *Owing to this cause, the Dutch cheeses have nearly been driven out of our market by the American.* In Holland, stall-feeding is the common practice; hence is the produce less palatable than the American, in which country, land being cheaper, the practice is unnecessary. There can be no question about the utility of stall-feeding, but I very much question whether close confinement is equally beneficial with a confinement allowing of some gentle exercise. When the weather is warm, cattle may pasture in the meadows without loss to the agriculturist. *The air is then nearer the temperature of their own bodies, besides being more expanded.* The animals feel no call for exertion to keep themselves warm, and the gentle motion necessary in the seeking of food, by increasing the healthy state of the body, enables them not only to eat more, but to assimilate better what they do eat. In winter the case is materially altered. The temperature is far lower than that of their own bodies; the air, too, being more condensed, contains a proportionally larger quantity of oxygen. Therefore, more non-nitrogenized food will be required to combine with the excess of oxygen; indeed, as we all well know, more food will be required than in warm weather. Here the peculiar advantages of stall-feeding come to our aid. *You will perceive that warmth produces a saving in food; it is indeed an equivalent for food.* Every thing that cools the body of an animal, causes a proportionate *expenditure of food*. In stall feeding, the temperature of the air of the stalls should be equally maintained, and they should be kept clean. The animals should be regularly fed, have plentiful litter, and be kept clean. If, as we have already said, warmth is an equivalent for food, it is obvious that the form in which the food is given cannot be immaterial. The more we facilitate the adaptation of the food for the organs of digestion, the greater will be the saving to us. The farmer cuts up his hay, straw and turnips to save some expenditure of force, hence of food, by the feeding animal. If the food contain much water of a temperature far lower than that of the animal, it must be raised to that temperature at the expense of a part of the food. This is obviated by the process of steaming. An ox, fed by Earl Spencer, consumed in a winter month (the temperature of the air 32°), 60 lbs. of mangel-wurzel a day. Now, in order to raise the temperature of the water of the mangel-wurzel to the temperature of the body of the ox, no less than one-twentieth of the food was expended. All feeders of pigs know that they thrive better on dry than on wet fodder. (Mr. B. sat down amidst great applause).

The CHAIRMAN then proposed "The healths of Mr. Stokes and of Mr. Allen," who made a few observations on the advantages of giving artificial food to animals in the straw yard. He had himself given oil-cake to cattle, and found it to remunerate him.

C. STOKES, Esq. rose to give his testimony to the principles laid down by Mr. Rawson and Mr. Bernays. He could fully bear out Mr. B.'s remarks on stall-feeding.

Mr. SMITH wanted to see science brought forward in connection with Agriculture. "We want," he said, "something definite and distinct on the formation of fat and muscle." He wanted defined what would produce most fat, milk, and cheese; and he hoped to provoke one of the gentlemen present to rise and define it. He hoped they would give them the kind and quantity of food to produce them.

Mr. C. W. WOOD, surgeon, of Woodhouse Eaves, said he would direct the few remarks he had to make exclusively to the expressed object of the meeting, namely, the feeding of cattle; and he viewed that as the most important matter with which the practical farmer had to do; in short, his whole life and exertions tended only to produce the greatest possible quantity of beef and mutton—if not in the shape of fat cattle, his supply of grain only produced the same effects in man. But before we talk of producing, it is necessary to ascertain correctly what it is we want to produce. All animals are composed of bone, muscle, fat, cellular tissue, wool, hair, horns, skin, and nails, and we find these very substances ready formed in vegetables, the power of nutrition in the animal having

nothing to do but select them from its food, and by means of the circulation to place them where they are wanted. If your object be, as in the young growing animal, to increase as well as to sustain it, you choose those vegetables which contain a large proportion of muscular fibre, or nitrogen and phosphate of lime for the bones, such as peas, beans, oats, barley, &c. If, with a full grown animal, your object be to sustain its condition with an increase of fat, you give those vegetables which contain fat ready formed, as lentils, Indian corn, oil-cake, &c. But as you have generally a mixed object in view, namely, to produce bone, muscle, and fat also, you must necessarily give a mixed food—the operations of which I will now explain. The composition of the animal and the vegetable world is identically the same, and the latter, wherever we find it, contains in a greater or less degree all the elements of the former. The vegetable world is sustained entirely from inorganic nature, the earth on which we tread, and the atmosphere we breathe, occupying a middle sphere, its whole existence being to collect materials to build up the animal, consequently entirely subservient to it. The inorganic world, again, is composed of a few simple elements, of which hydrogen, oxygen, nitrogen, carbon, phosphorus, sulphur, and some saline substances, as potassium, sodium and calcine, form the chief, the very elements of vegetable and animal life. Geology, chemistry, physiology, are therefore essential to the right understanding of this subject, bearing ever in mind that the lower are always administering to the wants and necessities of the higher orders of creation. There is no motion in an animal body, or emotion of mind, but what causes a corresponding absorption of the tissues of the body, and in order to keep up this daily waste, a certain amount of food is necessary. This is called sustaining the body. Thus cattle working hard require a larger amount of food than when at rest. This necessity being duly attended to, constitutes health. But fattening, gentlemen, is an unnatural condition, and requires an increase of substance. Hence the necessity of unnatural means, as the absence of exercise, light, and the influences of the atmosphere, a mixed diet (to bring out all the materials of the animal body to the greatest perfection) in a dry, warm state. *Mr. Childer's beautiful experiments proved that warmth alone with an animal would produce one-third more flesh, and at the expense of one-fourth less food, Mr. Norton also proved that the absence of light with warmth produced still greater results.* The reason of this is obvious. Every animal possesses both a nutritive and respiratory apparatus; the one to sustain the body, the other to support its vitality, by producing heat or warmth. This first object is effected by the gluten in the food principally, the basis of which is nitrogen. The second by the starch, sugar, and gum, contained in the food, which form bile, the basis of which is carbon. The bile passes into the intestines, where it meets with oxygen, and thus becomes carbonic acid. In this state it enters the circulation, where it meets with peroxide of iron (which the blood always contains), the carbon unites with the iron, and forms carbonate of iron. In this state it passes to the lungs, where it meets with fresh oxygen during inspiration, which re-converts the carbon in the carbonic acid, which passes off during expiration, while the peroxide of iron is reformed, and taken back by means of its carriers to be again transformed into carbonate. The result of this combustion of carbon is heat. The heat of the animal body is nearly 100 degrees: all food, therefore, before it can be assimilated must be raised to its own temperature, which can only be done by the consumption of carbon, or in other words, food. Potatoes, linseed-cake, and oleaginous seeds, on account of the starch, sugar, oil, and gum they contain, are well adapted to accomplish this end. If we reflect for one moment on the immense importance of the liver and lungs in the animal economy, is it not strange to see the score of diseased ones which our shambles are constantly exhibiting? showing the great inattention the farmer pays to the comfort and well-being of his cattle. Fat is a reservoir of carbon for the system to draw upon for the purposes of combustion, in the event of the food not containing a sufficient quantity of the proper elements to keep up animal heat. As manure is an important result attending the feeding of animals, it may be well to remark that its quantity depends upon the refuse of food, and the amount of absorption going on in an animal's body, or in other words upon its own destruction, thus returning to inorganic nature, as food for vegetable life, the elements of its own nature. But the quality depends upon the quantity of nutritious food given to the animal. The young, growing animal requiring increase as well as sustenance, consumes all the nitrogen and fatty matter in its food. The milking cow the same. But in the full-grown, feeding animal a large quantity of these ingredients is not consumed: a rich and valuable manure is the result. In choosing animals for feeding purposes, the farmer often exhibits a remarkable knowledge of physiognomy. He likes a kindly-disposed, quiet-looking animal, with symmetry of carcass; one built for strength, broad across the back and loins, and long quarters, where large masses of muscles are placed, a narrow and deep chest, and "a good handler," or where there is a large quantity of fine, soft hair, with plenty of fatty matter underneath to nourish it. Thus furnished, he has only to put into operation the suggestions of science, and the result must necessarily be both profitable and useful. When we see the extensive application of capital, industry, and science to the manufactures of this country, and the comfort and wealth they produce to thousands of our fellow-creatures, also the dominant influence of its interests, threatening the downfall of the British farmer, surely it is time, and our bounden duty, to unite these same principles, that the abundance of the soil may satisfy both landlord and tenant, and be the means, under the blessing of Divine Providence, of producing plenty of cheap food to the many thousands of our wanting fellow-creatures.

The CHAIRMAN proposed the health of Messrs. Smith and Wood.

Mr. SMITH replied, and expressed his gratitude to Mr. Wood for his elaborate exposition of the subject, and still hoped to see science and practice combined much more than he had done.

Mr. WOOD proposed the health of the Chairman, which was received with loud cheers.

The CHAIRMAN rose and expressed his gratitude for the kindly manner in which they had drank his health. He would have gone farther into the subject before them had it not been so ably treated by gentlemen of practical science. It was from practical men they must expect

useful information; and when they had practical men for their leaders, it was their own fault if they did not benefit by them. He bore testimony to some of the principles laid down by the previous speakers, and said he should feel pleasure in presiding at their meetings. Again thanking them for the honor they had done him, he resumed his seat amidst applause.

Mr. BERNAYS again rose, and said—In order to obtain a fair proportion of fat and lean, it is of the utmost importance that you should be acquainted with the composition of food. We should be very much mistaken were we to judge of the value of food by its *bulk*. Green-top turnips, mangel-wurzel, and red beet, contain 89 per cent. of water; Swedes, 85 per cent.; potatoes, 72 per cent.; oats and wheat straw, 18 per cent.; hay, peas, and lentils, 16 per cent.; and beans only 14 per cent. Hence the latter food is infinitely superior, as to its feeding properties, to the former. But we have only spoken of the food in relation to water: it is necessary that we should understand each other when we make use of certain terms. It is but too indefinite if we include fleshening and fattening in the term *fattening*: the term *rearing* would then be more appropriate. But it would be still better if we distinguish between *fleshening*, or the formation of muscle, and *fattening*, or the formation of fat. According to the quantity of non-nitrogenized constituents of food capable of forming fat, in other words, according to the supposed fattening properties of food, they rank thus:—1. Oats, barley meal, and hay; 2. Beans and peas; 3. Lentils; 4. Potatoes; 5. Turnips and red beet. According to their fleshening properties, they stand thus:—1. Lentils; 2. Beans; 3. Peas; 4. Flesh; 5. Barley meal; 6. Oats; 7. Hay; 8. Carrots and potatoes; 9. Red beet; 10. Turnips; 100 lbs. of lentils are supposed to be capable of yielding 33 times as much muscle as 100 lbs. of turnips. Great advantage, therefore, results from the admixture of food. An animal which has been fed chiefly on oil-cake, would, on being turned out, increase in size much more slowly than the animal which has been fed on hay, or on turnips and hay. The oil-cake produces chiefly fat, and little flesh; hence the movement of the animal will consume much of the ready formed fat, or tallow. It is only when the oil-cake is given with fleshening food—such as beans, oats, and hay—that lean is proportionally formed. Warmth, confinement, and fattening food are most favorable for the formation of butter, fat, and tallow. Herbage—which is generally denominated *poor*, but which, in reality, is *rich* in nitrogenized constituents, and which cows have to crop themselves—is favorable to the formation of cheese, but not of butter.

Mr. STOKES—Would you recommend the food to be given in a warm state?

Mr. BERNAYS—Decidedly; a little lower than the temperature of their own bodies.

Mr. STOKES proposed "The health of Mr. Burrows, and the Stewards."

Mr. B. returned thanks, and said he had been much pleased with the discussion that afternoon. He was sorry that more practical men had not risen to take part in it. He had found by experience that cattle kept dry and warm consumed less, and fattened better.

Mr. HENSON rose and asked what mixture of food Mr. Bernays would recommend. He was at a loss to know how to put these different elements together. He hoped to hear at some future discussion how to produce the largest amount of fat, without losing sight of the manure heap. He proposed the health of "Rev. E. Wilson;" who rose and returned thanks, and expressed his gratification with the discussion. He always found instruction at their meetings.

Mr. STOKES suggested that tables of the quantity and quality of food recommended, should be drawn out and some of the members requested to keep an ox or two, and give the result of their experiments for the benefit of others.

Mr. HENSON made another observation or two relative to the quantities of food and the manure heap, and

Mr. BERNAYS rose and said—I can only say, in answer to Mr. Henson, that I shall be happy to answer his questions as to the necessary quantities of food for producing flesh and fat, on some future occasion.

Mr. EATON said they had much science and a little practice. He would propose "The health of Mr. Walker," who would be able to give them a good deal of practical information (cheers).

Mr. WALKER said he had hoped to have taken his own pleasure on that occasion. He was almost afraid to venture an observation where there had been so much science. He felt inclined to walk away and largely benefit. As a practical man, he intended to make use of what part would suit him. The manure heap had been referred to, and he would observe, it was very well to have the whistle if they did not pay too dear for it. He would not recommend giving oil-cake to store cattle. They ought to be exceedingly careful how they gave oil-cake in the straw yard. Vegetables were the proper food for animals. He gave two pounds of oil-cake a day, and hay, to some cattle, and they did not do well; they were feverish; there was no swelling of the muscle, no lifting of the lean meat. He gave them turnips, and there was immediately an improvement.

Mr. SMITH made a few observations on the importance of attention to the temperature of the atmosphere to which cattle were exposed; and,

On motion of Mr. Henson, seconded by Mr. Stokes, it was resolved—"That this meeting entirely agrees with the science of nutrition now propounded, and recommends the practical farmer to test his theory by his experience."

Thanks were voted to the Chairman, and appropriately acknowledged; and the meeting, which occupied upward of four hours, separated.

AIR CHURN.—The Bishop of Derry has invented an atmospheric churn. Instead of the present unscientific mode of making butter by churning, his Lordship accomplishes this measure by the singular manner of forcing a full current of atmospheric air through the cream, by means of an exceedingly well devised forcing-pump. The air passes through a glass tube connected with the air-pump, descending nearly to the bottom of the churn. The churn is of tin, and it fits into another tin cylinder provided with a funnel and stop-cock, so as to heat the cream to the necessary temperature. The pump is worked by means of a winch, which is not so laborious as the usual churn. Independently of the happy application of Science to this important department of domestic economy, in a practical point of view it is extremely valuable. The milk is not moved by a dasher, as in the com-

mon churn; but the oxygen of the atmosphere is brought into close contact with the cream, so as to effect a full combination of the butyraceous part, and to convert it all into butter. On one occasion the churning was carried on for the space of one hour and forty-five minutes, and eleven gallons of cream produced twenty-six pounds of butter. [London Farmers' Mag.

REV. GILBERT WHITE'S NATURAL HISTORY OF SELBORNE.

THE LANGUAGE OF BIRDS.....CHARACTER AND HABITS OF THE WHIP-POOR-WILL.

It would be about as easy to "gild refined gold,' as, with our pen, to add anything to the force of the following essay, recommending every one in the country to habituate himself to noting all facts which may serve to extend the knowledge of *Natural History*. With such a habit, there is scarcely a school-boy who might not impart something new to the book-learned student of Nature. Who is it that cannot trace much of all his knowledge of this sort to his observation of facts while he was even yet in his teens? And, seeing the progress of modern discovery in every walk of Science, who shall set limits to what remains to be developed?

The inexhaustible resources for recreation and amusement which such a habit opens for him who once catches the inspiration, make for him those moments the most delightful, which hang like an incubus on the spirits of the listless, uncultivated drone. Walks and rides, that to the latter prove monotonous and fatiguing, to the former reveal, at every step, food for meditation, and elements of knowledge, elegant or useful. It is impossible for those who will not cultivate a sensibility to the beauties and varieties of Nature, in her humbler walks and works, to know how much there is to challenge their admiration in the most beaten paths of rural life and occupations. If he would be persuaded of this, let him take up, for instance, the "NATURAL HISTORY OF SELBORNE, BY THE LATE REV. GILBERT WHITE."

Selborne is a single parish in the County of HAMPSHIRE, England—affording, as might be supposed, in a scope so limited, but slender contributions to the stock of Natural History; but let him who may so conclude, put this delightful little volume in his overcoat pocket, the first time he has to make a journey by railroad or steamboat, on which he may have either no acquaintance, or may wish to escape from being bored by some male or she metaphysician in religion or politics; and our word for it, that, with such a pocket companion, he will find his journey more than one-half shortened.—To say more of the fruitfulness of the subject, and the expediency of cultivating a fondness for it, as illustrated by these notes of a clergyman and a scholar, in the confines of a single parish, would lead us on to a review of the book, which is not our design—the more especially as we contemplate a better use of it, some day, for the readers of the FARMERS' LIBRARY. The occasion, however, would seem to suggest the expression of regret that the minds of *our clergymen* should so rarely take the turn in which this amiable and engaging English pastor found the means of hallowing, with such agreeable associations, the name of his parish and his own.

To them, and, more especially, those of them who reside in the country, Natural History, in almost all its branches, appears in a peculiar manner to offer attraction and reward. Unfortunately, however, we are too apt to conclude that no ingenuity can impart interest for others to subjects which daily notice may have made familiar to ourselves; while, in truth, the man of simplest tastes, with feelings attuned to Nature, has but to betake himself to the most frequented highway, and thereupon make a *sentimental journey!* We will here, for example, take up on the spot, as it lies within reach, these said simple sketches of the Natural History of a single old English parish, and transfer, haphazard, a single chapter as it may open to us.

Well, it chances to be the one at page 260, on the "LANGUAGE OF BIRDS." Now, reader, mark what he makes even of the familiar subject of *Barn-Door Fowls and their habits!*

From the motion of birds, the transition is natural enough to their notes and language, of which I shall say something. Not that I would pretend to understand their language, like the vizier, who, by the recital of a conversation which passed between two owls, reclaimed a sultan,* before delighting in conquest and devastation; but I would be thought only to name that many of the winged tribes have various

* See Spectator, Vol. vii. No. 512.

sounds and voices adapted to express their various passions, wants, and feelings—such as anger, fear, love, hatred, hunger, and the like. All species are not equally eloquent; some are copious and fluent, as it were, in their utterance, while others are confined to a few important sounds; no bird, like the fish kind, is quite mute, though some are rather silent. The language of birds is very ancient, and, like other ancient modes of speech, very elliptical: little is said, but much is meant and understood.

The notes of the eagle kind are shrill and piercing, and, about the season of nidification, much diversified, as I have been often assured by a curious observer of Nature, who long resided at Gibraltar, where eagles abound. The notes of our hawks much resemble those of the king of birds. Owls have very expressive notes; they hoot in a fine vocal sound, much resembling the *vox humana*, and reducible by a pitch-pipe to a musical key. This note seems to express complacency and rivalry among the males; they use also a quick call and a horrible scream, and can snore and hiss when they mean to menace. Ravens, besides their loud croak, can exert a deep and solemn note that makes the woods to echo; the amorous sound of a crow is strange and ridiculous; rooks, in the breeding season, attempt sometimes, in the gayety of their hearts, to sing, but with no great success; the parrot kind have many modulations of voice, as appears by their aptitude to learn human sounds; doves coo in an amorous and mournful manner, and are emblems of despairing lovers; the woodpecker sets up a sort of loud and hearty laugh; the fern-owl, or goat-sucker, from the dusk till day-break, serenades his mate with the clattering of castanets. All the tuneful *passeres* express their complacency by sweet modulations and a variety of melody. The swallow, as has been observed in a former letter, by a shrill alarm, bespeaks the attention of the other *hirundines*, and bids them be aware that the hawk is at hand. Aquatic and gregarious birds, especially the nocturnal, that shift their quarters in the dark, are very noisy and loquacious—as cranes, wild-geese, wild-ducks, and the like; their perpetual clamor prevents them from dispersing and losing their companions.

In so extensive a subject, sketches and outlines are as much as can be expected; for it would be endless to instance in all the infinite variety of the feathered nation. We shall therefore confine the remainder of this letter to the few domestic fowls of our yards, which are most known, and, therefore, best understood.—And first, the peacock, with his gorgeous train, demands our attention; but, like most of the gaudy birds, his notes are grating and shocking to the ear: the yelling of cats, and the braying of an ass, are not more disgustful. The voice of the goose is trumpet-like and clanking, and once saved the Capitol at Rome, as grave historians assert; the hiss, also, of the gander is formidable and full of menace, and "protective of his young." Among ducks the sexual distinction of voice is remarkable; for, while the quack of the female is loud and sonorous, the voice of the drake is inward, and harsh, and feeble, and scarce discernible. The cock turkey struts and gobbles to his mistress in a most uncouth manner; he hath also a pert and petulant note when he attacks his adversary. When a hen turkey leads forth her young brood, she keeps a watchful eye; and if a bird of prey appear, though ever so high in the air, the careful mother announces the enemy with a little inward moan, and watches him with a steady and attentive look; but, if he approach, her note becomes earnest and alarming, and her outcries are redoubled.

No inhabitants of a yard seem possessed of such a variety of expression, and so copious a language, as common poultry. Take a chicken of four or five days old, and hold it up to a window where there are flies, and it will immediately seize its prey with little twitterings of complacency; but, if you tender it a wasp or a bee, at once its note becomes harsh and expressive of disapprobation and a sense of danger. When a pullet is ready to lay, she intimates the event by a joyous and easy, soft note. Of all the occurrences of their life, that of laying seems to be the most important; for, no sooner has a hen disburdened herself, than she rushes forth with a clamorous kind of joy, which the cock and the rest of his mistresses immediately adopt. The tumult is not confined to the family concerned, but catches from yard to yard, and spreads to every homestead within hearing, till at last the whole village is in an uproar. As soon as a hen becomes a mother, her new relation demands a new language; she then runs clucking and screaming about, and seems agitated as if possessed. The father of the flock has also a considerable vocabulary; if he finds food, he calls a favorite concubine to partake; and, if a bird of prey passes over, with a warning voice he bids his family beware. The gallant chanticleer has at command his amorous phrases and his terms of defiance. But the sound by which he is best known is his crowing; by this he has been distinguished in all ages as the countryman's clock or larum—as the watchman that proclaims the divisions of the night. Thus the poet elegantly styles him

> "The crested cock, whose clarion sounds
> The silent hours."

A neighboring gentleman one summer had lost most of his chickens by a sparrow-hawk, that came gliding down between a faggot pile and the end of his house to the place where the coops stood. The owner, inwardly vexed to see his flock thus diminishing, hung a setting net adroitly between the pile and the house, into which the caitiff dashed and was entangled. Resentment suggested the law of retaliation; he therefore clipped the hawk's wings, cut off his talons, and, fixing a cork on his bill, threw him down among the brood-hens. Imagination cannot paint the scene that ensued; the expressions that fear, rage and revenge inspired were new, or at least such as had been unnoticed before. The exasperated matrons upbraided—they execrated, they insulted, they triumphed. In a word, they never desisted from buffeting their adversary till they had torn him in a hundred pieces.

Thus, instead of a line of introduction merely, as we had intended, to a long but most impressive essay from an English periodical, we have been led on to add chapter upon chapter.

What a beautiful parlor-table book, by-the-bye, might be made *on the Natural History of Long Island!* with colored drawings of specimens and of individuals of all the departments to be found there, where still exists such a wonderful proportion of all the known birds of North America.

We know not how far this may, in fact, have been accomplished, by the powerful aid of Doctor DEKAY, in the Natural History of the State of New-York, prepared by authority; but we could wish that the library of the American naturalist could be enriched by some such scholar, with a separate work on the natural history of a region so remarkable and so rich, in a style that should be in suitable keeping with the progress of all the arts that might contribute to illustrate it.

We should be ashamed to be ignorant of the GREAT WORKS OF AUDUBON; but how far is that beyond the reach of Farmers, who object even to the cost of the FARMERS' LIBRARY, with its two annual volumes of 600 pages each, and all its expensive engravings?

For the sake of placing Audubon's works in every public Library in the country, to be open to the public use, how much more wisely might the general Government spend a small portion of the hundreds of thousands of dollars, which are now expended of the people's money for *military* memoirs, surveys, reconnoissances, books, reports, and schemes for blowing up ships and scattering death and destruction?

Being so far in for it, let us pay to his genius the tribute of a single extract, in point, from that inimitable *American* ornithologist, WILSON, whose delineation of the manners of the different species of birds that fell under his personal notice might be studied as models by every describing naturalist, and read with pleasure by every man of taste. His exquisite touches may well lead one to think that the naturalist, as it has been said of the poet, "*Nascitur non fit.*"

See what he says of one of our early spring visitors, the *Whip-poor-will!*

And here let us ask the gentle and kind-hearted lover of Nature, if he can ever, or would even wish to become insensible to that sort of melancholy yet not unpleasing emotion, excited by the shrill note of this mysterious bird, when his first returning salutation "strikes the key of remembrance and moans on the ear?" Imagine yourself riding slowly homeward through some lonely wood, the trees casting in the bright moon-light their fanciful shadows across your way; the mind falls naturally to musing on the vicissitudes of life, and retrospect lifts once again the curtain that oblivion would hang over the past; the earliest scenes in the play of life are the first to be reacted: school-boy companions, long since departed and almost forgotten, reappear in all the joyous freshness of youth, and as you approach your own dear home, where affection waits your coming with impatience, you almost audibly to yourself repeat from that best of English poems—

"The breezy call of incense-breathing morn,
The swallow twittering from the straw-built shed,
The cock's shrill clarion, or the echoing horn,
No more shall rouse *them* from their lowly bed;
"For *them* no more the blazing hearth shall burn,
Or busy housewife ply her evening care;
No children run to lisp their sire's return,
Or climb his knees the envied kiss to share."

In the midst of such meditations, the ear is suddenly struck by the sharp, clear-toned "*Whip*-poor-*will*," "*Whip*-poor-*will*," as if he *meant* to arrest and quicken your attention to some message of ominous portent. A feeling of deeper sadness, not immingled with curiosity, comes charmingly over you, and you are willing to listen, even though in dread of some painful tidings of domestic calamity, or you fancy this bird of night may be placed near your homestead to telegraph the death of dear and distant relatives. The reader that has never felt, will smile at such vain imaginings; so we give him the fine description of this singular bird, by Wilson, whose prose is conceived in the spirit of poetry—who always dipped his pencil in the colors of truth, and painted Nature to the life:

"On or about the 25th of April, if the season be not uncommonly cold, the Whip-poor-will is heard in Pennsylvania, in the evening, as the dusk of twilight commences, or in the morning as soon as dawn has broke. The notes of this solitary bird, from the ideas which are naturally associated with them, seem like the voice of an old friend, and are listened to by almost all with great interest. At first they issue from some retired part of the woods, the glen, or mountain; in a few evenings, perhaps, we hear them from the adjoining coppice, the garden fence, the road before the door, and even the roof of the dwelling-house, hours after the family have retired to rest. Some of the more ignorant and superstitious consider this near approach as foreboding no good to the family, nothing less than the sickness, misfortune, or death of some of its members. Every morning and evening, his shrill and rapid repetitions are heard from the adjoining woods; and when two or more are calling at the same time, as is often the case in the pairing season, and at no great distance from each other, the noise, mingling with the echoes from the mountains, is really surprising. Strangers, in parts of the country where these birds are numerous, find it almost impossible for some time to sleep; while to those long acquainted with them, the sound often serves as a lullaby to assist their repose. The notes seem pretty plainly to articulate the words which have been generally applied to them, '*Whip-poor-will*,' the first and last syllables being uttered with great emphasis, and the whole in about a second to each repetition: but when two or more males meet, their whip-poor-will altercations become much more rapid and incessant, as if each were straining to overpower or silence the other. When near, you often hear an introductory cluck between the notes. At these times, as well as almost at all others, they fly low—not more than a few feet from the surface, skimming about the house and before the door, alighting on the wood-pile, or settling on the roof. Toward night they generally become silent, unless in clear moonlight, when they are heard with little intermission till morning."

NATURAL SCIENCES.

ON THE IMPORTANCE OF AGRICULTURISTS ACQUIRING A KNOWLEDGE OF THE NATURAL SCIENCES AND A HABIT OF ORIGINAL OBSERVATION.

BY JAMES H. FENNELL, AUTHOR OF A "NATURAL HISTORY OF QUADRUPEDS."

NUMEROUS facts on record unite to convince me that agriculturists would find it very advantageous to habituate themselves to making minute examinations of little objects and incidents in nature which occur at every step, but are too often disregarded. It is desirable that agriculturists should not only read books on Natural History, but that they should closely observe with their own eyes everything in the fields, orchards, and gardens, that they may glean some useful hints from Nature's own volume.

In the cultivation of plants, it has been found best to proceed on such scientific principles as a correct knowledge of their structure and functions will suggest. The system of assolements, or the rotation of crops, by which the produce of our land has been quadrupled, and the acclimation of plants by hybridization or engrafting, by which means the fruits and flowers of more southern regions are reconciled to our climate, are only two out of many examples which might be adduced of the benefits conferred by Botany upon Agriculture.

While Science dictates such valuable improvements as these, the mere observation of trifling facts often suggests useful ideas. It is said that the occasional natural union of the boughs of distinct trees demonstrated the practicability of grafting, and that the observation of the circumstance of a vine shooting more vigorously after a goat had browsed on it, suggested the valuable art of pruning fruit-trees. In the sixty-third volume of the *Philosophical Transactions*, we find it related that M. Mustel, having observed that some of the flower-buds of an apple-tree had been gnawed off by a snail, in such a manner that all the petals and stamens had disappeared, being eaten up close to the calyx, which, together with the basis of the pistillum and the embryo, were left uninjured, concluded that those imperfect flower-buds would bear nothing, but was soon convinced of his mistake. Nearly all of them bore fruit; the apples were perfectly formed, and six or seven pretty large ones were seen upon each bunch. On the other hand, the snail had spared some other bunches which it could not so easily get at; but, out of ten or twelve flowers in each of these bunches, not above one or two exhibited any signs of fruit. This suggested to M. Mustel the idea that, when the flowers of trees are full blown, the prevention of the natural fall of the petals and stamens gives a greater assurance of the fructification—a fact which he several times proved; for, having cut off with the scissors the petals of apple, pear, plum, and cherry blossoms, close to the calyx, he found that almost every one of them bore fruit, whilst several of the uncut flowers bore none. Thus did a snail teach him how to render a tree more fruitful.—One of the Emperors of China, having noticed that a particular stalk in his garden produced better rice than the rest, cultivated it for several years; and then, having fully satisfied himself and his subjects of its superiority, he distributed its grains among them for their general benefit. A Sussex farmer, having remarked that some gooseberry bushes, growing under an elder tree, were exempt from the attacks of caterpillars, was induced to try the efficacy of a decoction of elder leaves in destroying the grubs that infested his turnip crops; and he, and other farmers who repeated the experiment, found it successful.

Here I may observe that it is not only necessary that the agriculturist should be well acquainted with the nature of the different vegetables which he cultivates for economic purposes, but that he should rightly understand the causes of the several ravages and diseases to which they are subject, so that he may be able to devise proper remedies and preventions. In this wide field for observation and practice, Natural History will be found a useful guide. In nine cases out of ten, the failure of crops, and the pecuniary loss experienced thereby, arises from the attacks of some particular species of destructive insect, which, from unknown causes, has appeared in unusually great numbers. Before any effectual steps can be taken against it, it is absolutely necessary to ascertain correctly what species of insect is causing the mischief, and to study the creature's habits in all its transformations; for what will prove more or less effectual in one stage of its existence, will be totally useless, or, perhaps, increase the evil in another.—Notwithstanding the immense annual losses which must be caused by the millions of destructive insects that infest all kinds of crops, the science of Entomology is comparatively neglected by agriculturists, who are, therefore, frequently unable to give a definite description of any noxious insect to a naturalist when they require his opinion and advice.

Those husbandmen who have possessed some knowledge of Natural History have not merely been better able to cultivate their plants and protect them from the attacks of hurtful creatures, but they have ascertained thereby what creatures are harmless and useful, and therefore to be spared and encouraged. Without this power of discrimination they may be unwittingly led into the error of destroying creatures which were absolutely beneficial to them. Lady-birds, which are now well known to be most useful little creatures, feeding only upon the hurtful plant-lice, were at one time as mercilessly destroyed as the plant-lice themselves.—We are told by Mr. J. D. Salmon that, in the neighborhood of Scoulton, in Norfolk, there is a very extensive colony of black-headed gulls, *(larus ridibundus,)* which are carefully protected and encouraged by the farmers, who have noticed that they render most useful service by following the plow to feast on the cockchaffer grubs and other insects that it turns up to the surface. So greatly do the farmers value the

assistance of these birds, that they have implored the proprietor of the mere at Stanford Warren to discontinue gathering their eggs. In the first season after their eggs were spared, it was calculated that not less than 15,000 young birds were hatched; and the immense supply of food which this numerous progeny required, greatly increased the exertions of the old birds in obtaining for them many thousands of worms and insects.

Those farmers who, from ignorance, permit poisonous wild plants to spread unchecked, frequently sustain serious losses among their cattle; for though these animals refuse such plants when grown to maturity, yet in the early spring, when there is a deficiency of herbage, and the noxious sorts betray no sensible odor, they will eat, in their extreme eagerness for green food, almost anything that presents itself. Linnæus mentions the death of many cattle from feeding, in early spring, upon the water-hemlock, *(cicuta virosa;)** and, more recently, Mr. Edwin Lees has recorded the death of several fine cows from eating the roots of a poisonous umbelliferous plant which had been carelessly suffered to grow about the sides of a ditch.

Natural History, in its most extensive sense, being inseparably connected with all the arts of life, ought to form a part of the education of those who wish to promote them and to benefit by them. In every school in the kingdom, whether intended for males or females, for the rich or for the poor, Natural History should find a foremost place as an elegant and useful accomplishment. There is hardly a common animal or plant concerning which some egregious error may not be detected in the minds of the generality of what are termed well-educated people, who pride themselves on possessing a *finished* education—finished, indeed, before it had fairly commenced; for they who have learnt anything know that neither man's nor woman's education can ever be complete, as every day of our lives may be made to yield an improvement upon the lessons of our youth. No one will rest content with what he knows to-day, unless he wishes to be a dunce to-morrow. The wisest men love to call themselves students and laborers in the mines of Knowledge, seeking for new facts and even for new sciences that are yet in concealment, and which are destined to improve the earthly condition of man, and to impress him still more strongly with an incessant conviction of the care which God has taken to provide innumerable blessings for His industrious and grateful people—blessings which He has but temporarily hidden from us, so that we have the advantages of labor, health, and hope, in seeking for them. All the world was simply Nature when God completed it; and Natural History, in its widest meaning, is the history of that world of Nature; and, therefore, ignorance of Natural History is ignorance of God's world, which presents the most sublime and useful study man can pursue.

How general the existence of ignorance is on the subject of Natural History may be easily conceived from the absurdities relative thereto which may be found in the writings of even the most popular essayists, novelists, critics, and others who are more literary than scientific.—Latin, Greek, and Heathen mythology have been too frequently learned, to the entire exclusion of any knowledge of those divine works by which we are surrounded, and whereby we may practically benefit ourselves and fellow-creatures. In Sweden, Natural History is the study of the schools by which men rise to preferment; and we are assured by the celebrated botanist, Sir J. E. Smith, that there are no men with more acute or better regulated minds than the Swedes. In the forests of Germany, especially in the small States of the interior—the Hartz, Thuringia, &c.—there are schools in which are taught Surveying and Planting, together with the Zoology, Botany, and Mineralogy of the forest. At one of the most celebrated schools in the world—namely, that of M. De Fellenberg, at Hofwyl, in Switzerland—it is the chief aim of the instructor to inculcate in his numerous pupils the importance of closely examining such surrounding objects of Nature as will most concern them when pursuing the particular professions and trades for which they are intended. The school contains about 450 scholars, among whom are many peasant boys; and no opportunity is lost of directing the attention of all, but especially of the latter, to Nature's works; which are eagerly sought after, attentively studied, and most carefully perused for future reference and instruction. The collecting of these objects affords an employment which is not only amusing and useful, but healthy. The museum thus formed is constantly increasing, both in variety and utility. The plants it contains are not classified scientifically, but according to their properties, uses, and localities.—Seeds and specimens of useful sorts of wood enrich this botanical collection. Quadrupeds, birds, reptiles, and insects are also studied and preserved by the pupils. The winter evenings are instructively spent in this room by the poor children with their master; and on Sundays, after church, they go forth to the hills and woods, seeking fresh treasures for their museum. At Carra, in the neighborhood of Geneva, there is also an agricultural school, where the children are taught the economic Botany of their native country, besides a variety of other useful subjects. They amuse themselves with botanical excursions, and the little students carefully bring home and preserve all the plants which they collect.

Hogg, the Ettrick shepherd, declares that those writers speak falsely who assert that our laborers, herdsmen, and peasants in general, have little or no feeling of the beauty of Nature; and he might have added that they are frequently close observers of her works. This fact induces me to believe that much benefit would arise by giving a more scientific aim to their habit of observation. How readily the shepherd notices slight external differences, even in objects of the same species, is exhibited in his ready discrimination of any one sheep in a flock consisting of even many hundreds, though to the casual observer all the sheep seem exactly alike. Without some nice study of Nature's minute distinctions, the shepherd could not so easily detect any sheep in a large flock.

The aptitude of peasants to receive scientific truths, when their curiosity is properly awakened, might be illustrated by mentioning a glorious list of eminent philosophers who have arisen from the ranks of shepherds, plowmen, &c.—We shall, however, mention but two examples. At Bagis-Beost, near the hot springs of the Pyr-

* A similar plant, *œnanthe crocata*, has lately been discovered by Prof. Christison to be innocuous to man and animals in Scotland, though in the south of England, and also in France and Spain, it has proved itself an active poison. [*Editor.*

ences, lives Gaston Sacaze, whose name has been well known for the last twelve years to philosophical travelers in those parts. Without even quitting his native mountain, or neglecting the care of his flock and the cultivation of his fields, he has found sufficient time to acquire a good systematic knowledge of the Mineralogy, Botany, and Entomology of his native district, entirely unassisted by any teacher except his own eyes and a few books. That he might read the works of Linnæus, he has taught himself Latin. Besides systematically classifying all the mountain plants, he has drawn and colored them, so as to form a rich berbal. At his humble home he has also formed a collection of minerals, stones, insects, &c.; and, when tending his flock, he amuses himself with a violin of his own constructing, and songs of his own composing. So much notice have his talents attracted, that his portrait has lately been taken by the celebrated painter, Devéria. This peasant naturalist calls to mind the instance of John Bertram, the famous Pennsylvanian botanist, who was originally an agricultural laborer, but having his intellectual curiosity excited by an attentive contemplation of a violet, and then dreaming about its beauty and structure, immediately set about learning all the Latin that was requisite to read botanical works.

Great Britain abounds in grammar schools for the poor, but where can it show anything like the forest schools of Switzerland, Sweden, and Germany? Where are the instructors to teach our peasantry those sciences which they would be practically benefited by understanding?—We want to see a full consummation of the benevolent wish of Dr. Drummond, that a lecture-room, a museum, and a useful library should be attached to every village, as regularly as its church or chapel; and that a portion of time should be appropriated to teaching Natural History, and even Natural Theology, to the peasantry. Geology and Agricultural Chemistry should also be made to throw their light upon the laborer's mind, and his children should be taught something about these subjects, as well as grammar and ciphering. Agriculture would more rapidly attain to perfection, if all, without exception, who are concerned in it, were made clearly to understand the processes on which its fullest success depends. The laborer could not fail to become more skillful and more interested in his employment, if he were taught to practice it as a science, and not merely as a toil.

The culture of plants will become a comparatively easy process when we are better acquainted with their peculiar functions, and with the chemical elements which they require for their growth and maturation. We must not be content with knowing what are their respective natural localities, climates, and seasons, but must learn what chemical gases each species imbibes from the atmosphere, through its leaves, and what substances from the soil, through its roots. "If a plant be distinguished by its containing a notable proportion of soda, silica, &c. the soil in which it is to be grown must," as a writer in the *Edinburgh Journal* justly observes, "contain these elements, otherwise the attempt will be abortive;" for a plant can no more create soda or silica within itself than it can form water for its support, independent of the soil or atmosphere. From a knowledge of the principles, therefore, a rational theory of Agriculture may be formed; and what has hitherto been little better than an expensive and often distressing system of trial and error, becomes a science guided by fixed laws. Agriculture will always have to contend with the fluctuations of season and climate; but it is for human ingenuity to modify their influence, and this can only be effected by rational and scientific procedure. As yet, the science of Agriculture is only in its infancy; but the time is not far distant when it will rank with other maturer branches of knowledge—when every soil will be systematically treated for the species of crop to be raised upon it—when manures will be manufactured as we now manufacture soda and sulphuric acid—when plants will be fed and stimulated as we now treat animals—in short, when the farmer will sow and reap with as much security as the distiller produces his spirit. The value of the science of Chemistry to the agriculturist may be judged from the fact that, when the great French chemist, Lavoisier, took a quantity of land into his own cultivation, he very soon succeeded in doubling its produce.

If the proprietor of land would explore its mineral productions with a view to speculation in them, he ought previously to obtain some knowledge of Geology. To an ignorance of this subject may be traced the lavish expenditure of money in many futile attempts to find coal in situations where the slightest regard to the principles that have been established, and the rules that have been discovered, relative to the association of coal with certain stratified rocks, would have saved those individuals from ruin and misery. As a striking example of the serious consequences that have ensued from seeking coal without acting under the guidance of geological principles, Sir John Herschel relates that an attempt was made, not many years since, to establish a colliery at Bexhill, in Sussex—the appearance of thin seams and sheets of fossil wood and wood coal, with some other indications similar to what occur in the neighborhood of the great coal beds in the north of England, having led to the sinking of a shaft, and the erection of machinery on a scale of vast expense. Not less than £800,000 are said to have been expended in this project, which, it is almost needless to add, proved completely abortive, as every geologist would at once have declared it must—the whole assemblage of geological facts being adverse to the existence of a regular coal bed in the Hastings strata; while this, on which Bexhill is situated, is separated from the coal measures by a series of interposed beds, of such enormous thickness as to render all idea of penetrating through them absurd.—The history of mining operations is full of similar cases, where a very moderate acquaintance with the usual order of Nature, to say nothing of theoretical views, would have saved many a sanguine adventurer from utter ruin.

In learning the nature of the underlying soils, and the character of the surface soil, which in many instances depends upon the decomposition of the subterraneous strata, Geology affords most valuable assistance. From the mere description of the character of any line of country, the geological agriculturist might form a tolerably accurate notion as to what must be the productions, pursuits, wants, and even the general constitutions of the inhabitants; and, if he possessed a knowledge of Geological Botany and Geological Entomology, he would also be able to predict what genera of plants and insects were there most plentiful. Geology could point out to him stores of lime and mineral manure in

places where they were not generally known to exist. Without an ample supply of water, no farming can be prosperously conducted; and here again Geology comes to our aid, and suggests the formation of those Artesian wells which have given the precious blessing of water to many previously dry districts, as in France and various parts of England. Observation on the surface of the earth detects the deep reservoirs below. "Search and ye shall find;" for wherever deposits of a light and porous nature occur in hollows and depressions of firmer and older rocks, water will penetrate until it has accumulated into immense subterranean pools—the pressure of the superior strata preventing the fluid from exhibiting itself to the eye, except in slight oozings at the indented parts of the surface. When proper borings are made through the strata, the water is released from its confinement, and rushes up copiously from the valley or hollow. Beneath those spots of ground over which swarms of gnats are continually seen dancing in the air, the existence of wells may be suspected; for these insects disport themselves always where there is the greatest evaporation. It was by a secret knowledge of this fact that the professors of the divining rod detected hidden wells. Slight superficial observation may also detect concealed mineral springs, which may add to the value of an estate. Thus the discovery of the chalybeate spa at Dorton, in Buckinghamshire, originated from some villager's attention being attracted to the circumstance that a little stream, which issued from a small orifice, destroyed the plants that came within its course; the few blades of grass that were spared bore a thick incrustation of oxide of iron; and the surface of the ground, which, for a few yards on either side of its channel, assumed a yellow and scorched appearance, was covered with a similar metallic deposit. The peasants called it the *Alum* Well—the taste of that substance being most apparent to them. It was also observed here, as at the Bath waters, that diseased cattle voluntarily and repeatedly repaired to the little stream, and rapidly recovered from their maladies. It was noticed that it afforded great relief to horses suffering from that very obstinate and almost incurable disorder, the mange. Owing to the powerful chalybeate qualities of this water, the manure of the cattle that drink of it will burn to a cinder, and is collected for fuel, in the same way that the Peruvian miners and mountaineers make bright and clear fires of the dung of the llamas and alpaccas.

These several facts will, I trust, suffice to show to every reader the policy of the agriculturist greatly enlarging his present sphere of knowledge, and the frequent advantages that would result from his practicing a habit of original observation, with a view of deriving important suggestions from apparently trifling facts.

[Jour. of High. and Agri. Soc. of Scotland.

"LIME ENRICHETH THE FATHER BUT IMPOVERISHETH THE SON."

As "all is not gold that glitters," so all popular mottoes are not the very essence of wise experience. Some have their origin in ignorance, and gain currency for want of examination. With the majority of mankind, it is much more agreeable to take things for granted, than to go through the trouble of investigation. This lazy disposition, inherent in our nature, to take things for granted, gave rise to the story or the fact, of the French philosophers, who, on being asked by Doctor Franklin *how* it was that a pot full of water would not overflow if a two foot rock-fish should be put into it, straightway put on their considering caps, and set about gravely to account for it, without ever asking whether the *fact was really so!*

On this vulgar compound of ignorance and credulity, many an empiric and charlatan has traded and passed himself off, within our observation, for a *wise man*, whose only virtue was that which has been called a rascally one—denominated *prudence*. They have had the prudence to keep their mouths shut, aware of the common saying that a "still tongue shows a wise head!" while in many cases it is the fruit more of cunning, than of wisdom.

The motto at the head of these remarks, is not only fallacious but mischievous; and knowing how apt the best of us are to be misled by sententious and oracular expressions of this sort, especially where they address themselves to our avarice or indolence, the obligation is the greater to denounce and expose it.

Far from dissuading young farmers from the use of lime, under the specious theory that *every thing that stimulates, must be followed by exhaustion*, there is no service that we could render to Agriculture, of which we should be prouder, than if we could devise some means, whereby every young farmer in Maryland and Virginia, and all the old States, could procure *an adequate supply of lime*, to put from 50 to 100 bushels on every acre of his worn-out land. In truth, we regard this as the *great desideratum* of a large portion of the States above named. The real question is, not whether the use of lime be judicious and advisable, but *how is the poor farmer to get it*, and at how high a price will he be justified in going before he should decline the use of it?

Instead of fearing that he may enrich himself and impoverish his son by ulterior exhaustion of his land, if there be any one commodity for which Prudence herself would hold him justified

in *going in debt*, that *commodity is lime!* and if prudent and judicious young farmers could command the capital to buy it, even borrowed capital, the increased product of the land would redeem the debt with more certainty than most mercantile adventures can do, for which it is so easy in towns to raise the means; and the whole aspect of the country would be changed and improved.

Let any one who wants to see the effect of capital so applied, and especially as far as *lime* may be involved in the inquiry, look at the farm of F. P. BLAIR, Esq. near Washington. Reference to all such cases, we are aware, is apt to be met by the ready suggestion, that "with plenty of money, every one can improve and fertilize and give a new aspect to poor land;" but this is not true, for many a man, though not meaning to be improvident, squanders his means and wastes his exertions in unskillful appliances of both; but even if it were true, what better service to the landed interest, ay, and to the country, can any man of means render, than to show how capital may be made to yield adequate return, when applied with judgment to *the most important and useful of all human pursuits?* Such men become eminent benefactors of the commonwealth, by demonstrating under the very eye of city capitalists, that their sons would do wisely to betake themselves to farming, instead of being all huddled together in cities, as if it were the *country* that is infected with plague, pestilence and famine!

Returning to *lime*, which, with ashes, we understand to be the basis of regeneration, effected in the estate to which we have already referred, we may add that we understood Hon. Willoughby Newton of Westmoreland, Virginia, some days since to say, that he had made on an estate on the Potomac, this year, *eight per cent* on all the capital embarked, as well in the cost of the farm, as on all the property employed and all the expenses incurred in the cultivation, and his chief reliance is on *lime*. The staid and judicious farmer of Montgomery county—exemplary in all things, with a few exceptions (such as not *taking the* FARMERS' LIBRARY) don't stop to inquire whether lime "enricheth the father but impoverisheth the son." All he asks is, (and that after ample experience and close calculation,) "*by what means, and how much can I get.*" To get money to buy lime, they will sell almost any thing but wife and children and a favorite dog; for they know that if they can get enough of it, instead of impoverishing the son, they can "set him up" in their own life time.

Referring once more to the motto that "*Lime* enricheth the Father, but impoverisheth the Son," the true explanation is so well given in the following which we find in the North British Review, that we give it in lieu of, and as better said, than any thing we could offer:

"The addition of lime to the land has, in nearly all well cultivated countries, extensively prevailed at every period of authentic history. In Europe, its use has been universal, and every where the same observation has been commonly made, and has become a proverb in almost every language. "Lime," the proverb says, "enricheth the father, but impoverisheth the son." Laid on in repeated doses, and for a length of time, the luxuriant crops it raises at first gradually fall off, till at length, even with the stimulus, as it is called, of larger doses, the land refuses to be excited. A like result has been observed of late years from the application of gypsum, of nitrate of soda, of common salt, or of saltpetre. Their good effects were apparent for a certain number of years, but they gradually ceased to act, and the land was afterwards believed to be even weaker and less productive than before. How are these results to be explained? Can this apparent exhaustion be prevented? Can it easily be remedied? Is it a necessary consequence of the use of lime, and of the other substances we have mentioned? Is the manure or the farmer to blame for the result? The plant carries away from the soil say 10 substances. The soil is deficient in one of these, and the plant cannot grow. That one is lime or soda. You add it to the land, and your crops spring up luxuriantly. Rejoiced at this result, you add more lime, and your crops still grow well—for it requires the addition of 300 or 400 bushels to an imperial acre to add one per cent. of lime to a soil which is 12 inches in depth. But after many crops the lime at length ceases to benefit the land, the crops are even smaller than they were before lime was first added, and the farmer is at a dead stand. Now what has he been doing all this time? He has been adding one thing only in his lime—he has been carrying off 10 in his crops. Is it any wonder, then, that after a lapse of years, the land should become poor in one or more of the other nine? The iron-smelter throws into his furnace his ore and his coal, but he gets no metal until he puts in lime also. He adds a dose of lime, and he draws off a running of metal. He adds more lime, and he procures perhaps more iron. But he very soon finds that lime does no farther good; he has melted out all the iron; he has exhausted his furnace; the stimulus of lime has no effect. He must add ore and coal again, and again he will obtain his periodical flows of metal. So it is with the soil. The farmer who hopes by the continual addition of one thing, to make his land produce continual good crops, hopes and acts against reason. It is his fault that the land has become exhausted, and the cure is in his own hands. Lime, therefore, does not necessarily "impoverish the son." But any treatment will ultimately make the land poorer which does not return to the soil all the things which the crops have carried off, and at least in equal proportion."

REMARKABLE AND IMPORTANT DISCOVERY. An Italian chemist has discovered a liquid preparation which will stop the worst hemorrhage, even that from cutting an artery. It is applicable to many other purposes; and if half that is said of it be true, it must prove of great value.

CAPITAL NEEDED FOR AGRICULTURAL IMPROVEMENT;

HOW IS IT TO BE PROCURED?—FARMERS EXHORTED TO UNDERSTAND AND DEFEND THEIR RIGHTS AGAINST THE ENCROACHMENTS OF PRIVILEGED CLASSES.

Among the variety of Banks with titles intended to delude ignorant and credulous, and sometimes corrupt representatives of the farming interest, such as *Farmers'* and Merchants', and Commercial and *Farmers'* and *Farmers'* and *Planters'* Banks, all of which have quickly glided into the hands of speculators on the labors of the farmer; would it not be well to have a Bank that *should pay bills drawn on it expressly for lime and plaster and clover seed, and the necessary implements and buildings?* How much the wealth of some States would be enhanced if some such arrangement for the accommodation of industrious men could be made, and could it not as well as the thousand associations which are formed for the promotion of industry and the security of property, in *all the towns?* In the cities, men of every trade and pursuit as instinctively associate and club together their means and their wits, for the common safety and benefit of *their respective classes*, as you will see a gang of wild hogs, at the sight of the sportsman's dog, run together in the form of a wedge, with the old boar making the point of it, to resist every attack.

In towns, every separate business is formed into, and its interests looked after, by a distinct organization. Hence there are banking and other companies and incorporations of mercers, grocers, merchant-tailors, iron-mongers, dyers, brewers, leather-sellers, bakers, tallow-chandlers, curriers, masons, coopers, blacksmiths, plasterers, stationers, upholsterers, musicians, basket-makers, glaziers, apothecaries, shipwrights, spectacle-makers, clock-makers, comb-makers, soap-boilers, cartmen, porters, watermen, and the Lord knows how many more. By means of such associations, all necessary information is readily procured. The peculiar statistics of each trade, its grievances, its wants, its rights, are all ascertained and understood, and the means of defence and aggrandizement defined and provided for. At the first snuff of "oppression in the tainted breeze," sagacious lobby-members are despatched to attend the Legislature, (composed *nominally* of the representatives of the farming interest,) with the needful to pay their expenses, both direct and *incidental!* It is thus that agriculturists, who constitute the bone and sinew of the land, scattered without concert, credulous and inert, ever have been, and ever will be, preyed upon by trading politicians ever watching the popular tide, to know what side they shall take—

> "So some rats, of amphibious nature,
> Are either for the land or water."

Thus has the farmer's substance always been devoured by idle, unproductive classes of men, whose personal aggrandizement and sinister acquisition of power and privileges, are usually secured at a proportionate sacrifice of the general welfare.

How else but by indolence and credulity on one side, and the incessant encroachments of particular and banded classes, with all their affiliated influences, could it have happened in this isolated republican country, that the landed interest pays *so many millions* for the education and support of favored, unproductive, though honorable and high-minded men,

> "Whose trenchant blades, Toledo trusty,
> For want of fighting have grown rusty,
> And ate into themselves for lack
> Of somebody to hew and hack"—

classes that want nothing but the *name*, to constitute a *nobility*, for in practice it is well known that warrants and life commissions have been often demanded and granted on the ground of *hereditary* claims.

But hoping nothing from Government, not even the release of the sum entrusted to it by a generous foreigner, Smithson, for the diffusion of useful *civil* science, we again invoke the generous feelings and ingenuity of our readers, to devise and suggest some means for affording capital to be *directly employed in the improvement of the worn-out lands of the old States*, in cases where security can be offered, that it will be so employed skillfully and *bona fide* by land-holders, so many of whom want nothing but a helping hand in the beginning, to do all and more than skill and industry can effect with equal certainty in any other pursuit. But no system of short credits will answer in his case, as in that of the merchant or trader. The ship may make her voyage and return with her cargo, the proceeds be realized and the notes taken up, another cargo shipped and return cargo sold, before the farmer begins to realize the benefit of his plaster or his lime. But give him time, and that benefit is more

sure to come, the profit more certain to be realized, than the profit of the merchant. The farmer reaps a double profit in fact—first in the improvement of the land, which enhances the security for the debt, and in a certain increase of the crop, each more than the interest on the debt. But how is *he* to get the means? Let him but change his occupation—let him fly from the *land*; let him abandon the *country*, and form fellowship with any of the various crafts in town, and the same industry and integrity will ensure him credit and capital—nay, as if to assist in, and give activity to, the system which is desolating the country for the aggrandizement of the cities, the legislation of the Government is to be framed as if expressly intended for that end. Thus, the "*warehousing system*" is devised, that he who has no capital, even to pay duties, if he has the credit which industry and good character, and letters based upon them, will command for him in Europe; the Government is to build him a warehouse in which he may store his goods until he can put them up at auction, and sell them to pay the duties. In this way is the power of Government so wielded by the so-called *representatives of the landed* interest as to help along every other class but that on which all others live, as birds live on the grains of the field and the fruits of the orchard. We complain not of this giving a wing to honest industry to make it useful and productive to the State; on the contrary, it is all right; but why make fish of one and flesh of another? Can no plan, no association be devised, to give equal assistance to farmers whose care and skill and industry and economy, would offer a sufficient guaranty for the specific appropriation of the amount to the improvement of his estate? In New-York, the land-holder can raise any reasonable amount on "*bond and mortgage*," and these bonds and mortgages, owing to the ampleness of the security, and the facility with which the money may be at any time realized, pass currently from one capitalist to another, and become favorite objects of investment. While the interest is punctually paid, the principal is rarely called for; in the mean time the estate is improving, and every year making for the holder of the bond and mortgage "assurance doubly sure." In Maryland, and we believe in Virginia, the land-holder, however industrious and exemplary, enjoys no such facility, but is doomed to drudge on through a long life-time, effecting results that, if he could get the means which may be commanded by a *manufacturer or a merchant*, having not so much solid security to offer and no better character than he, would enable him in five or six years to double the value of his estate; for after all, there is no business that will better, and at the same time so *surely* reward capital and industry, as Agriculture will when the labor and capital employed in it *are applied with judgment and economy*.

For ourselves, we confess with shame to no such knowledge of money matters as will enable us to sketch a system to meet the case we have presented. In such matters our evil genius, or misfortune, or fault, has ever been to get clear of that sort of "dust" quite as fast as we could get it. With us, money has ever been truly the representative of labor, but then scarcely can we touch it before it "maketh itself wings and flieth away," so quickly, indeed, that it seems not to go into the chrysalis state, but is as it were *born with wings*. Nevertheless, we will offer, on our own hook, a volume of the FARMERS' LIBRARY, in extra binding, to any one who will supply for its pages an essay, and frame of a bill, for the action of the Maryland and Virginia Legislatures, the object and frame of which shall be, to offer such inducements as will secure to *the land-holder* facilities equal to those enjoyed by other classes, for borrowing capital on the pledge of landed property. The credit must be long, in proportion to the time it requires to realize the benefits; and no system can be effectual which does not make the restoration of the capital easy and certain to the lender or his order; nor will the *great public object*, that of *improving the country*, be accomplished unless the strict application of the fund to that object be in some way secured.

In the mean time we so far venture to intermeddle in *agricultural* politics, as to recommend every land-holder in the United States to bethink himself whether he ought not to demand of the Government, which is his creature, framed for his benefit, and for the support of which he is taxed—whether, we repeat, he ought not to demand of the Government, that for every round dollar expended for the diffusion of *military* knowledge and the support of military establishments, an equal amount, at least, shall be expended for the diffusion of *agricultural knowledge*. On this subject we shall enlarge and insist by every form of argument and illustration, as long as these three fingers can wield a pen. The reader will believe that when we dwell on the want of means to give activity to landed capital and plead for more profitable results to rural industry, it is in no spirit of avaricious hankering after wealth—inordinate wealth, for wealth's sake. No! with all ideas and plans for bettering the condition of the agricultural interest we contemplate only the same fair return for diligence and ingenuity in the use of the plow, that attends them in other pursuits—as far, at least, as depends on any action of government. What we eagerly seek, and almost hope to see, is, that Farmers shall become more enlightened—more apprehensive of

their rights, to the end that in the exercise of the powers of Government, the preference which is due *shall be paid to their concerns.* We wish not, by rendering them discontented to incite them to abandon, but rather to make them love the country, by showing them how fields that are exhausted and would be abandoned in despair and disgust, might be made to yield comfort and honor if not riches to their owner. Having in a just appreciation of their rights and a sense of self-respect, done all that prudence and honor, skill and industry, can accomplish, let them learn to be content with their lot, nor pine at the prosperity of the rich and the great; for neither riches nor greatness can confer happiness. *That* must be found in *virtue.*

"'T is virtue reigning in the generous heart
Alone can true, substantial bliss impart;
'T is this, strong-beaming, though our noon be past,
Bids life's short day be splendid to the last;
Charms pain and sickness in the saint and sage,
And melts to joy the hour of freezing age.
In want, content unenvied wealth bestows;
In sickness patience, and in pomp repose;
All wonders rise at her invoking breath—
A life of rapture from the womb of death."

HONOR TO MERIT.—TRIBUTE TO THE LATE EARL SPENCER.

If any English or French Admiral or General, renowned for success in the trade of war—no matter how unhallowed and diabolical the cause of it—had recently died, it would have been announced in flaming capitals in every paper in the United States; such is the barbarous propensity of mankind to be overpowered by and do abject homage to *military* achievement. Let a civil man of the amplest means, and the noblest inclinations to use them for the benefit of his species—for the increase of bread and the diffusion of knowledge among mankind—die in the midst of his usefulness, and, for all the world cares, he may die; and Editors, knowing for what appetites they cater, will leave him to be forgotten, while all around is teeming with the benefits of his munificence and the fruits of his good example.

For ourselves, we take a mournful pleasure, *Englishman though he was!* in putting on our record the following obituary tribute to Earl Spencer, by the Royal Agricultural Society, on the 5th of November last:

On the motion of Mr. Pusey, M. P. seconded by Mr. Shelley, the following resolutions were carried unanimously, namely:

"That this Council, deeply sensible of the great loss sustained by the Royal Agricultural Society of England, in the lamented death of John Charles Earl Spencer, feels it to be a duty to record its deep sense of his unvarying perseverance in promoting the establishment and advancement of the Srciety; its sincere estimation of his humility, combined with manliness—of his uniform candor and urbanity; and its cordial sympathy with his family on the visitation with which it has pleased Almighty God to afflict them.

"As a proof of our gratitude and respect toward our late colleague, we elect Frederick Earl Spencer to fill the vacancy in the number of the Trustees of the Royal Agricultural Society of England, caused by the event which we all so deeply deplore."

Mr. John Grey, of Dilston, Northumberland, was then duly elected a General Member of the Council, in the place of Earl Spencer, transferred to the list of Trustees.

THE ROOM OF THE HOUSEHOLD.

BY ELIZA COOK.

There 's a room I love dearly—the sanctum of bliss,
That contains all the comforts I least like to miss;
Where, like ants in a hillock, we run in and out,
Where sticks grace the corner, and hats lie about;
Where no idlers dare come to annoy or amuse
With their "morning-call" budget of scandalous news:
'T is the room of the household—the sacredly free—
'T is the room of the household that 's dearest to me.

The romp may be fearlessly carried on there,
No "bijouterie" rubbish solicits our ear;
All things are as meet for the hand as the eye,
And patchwork and scribbling unheeded may lie;
Black Tom may be perched on the sofa or chairs,
He may stretch his sharp talons and scatter his hairs;
Wet boots may "come in," and the ink-drop may fall,
For the room of the household is "liberty hall."

There is something unpleasant in company-days,
When saloons are dressed out for Terpsichore's maze;
When the graceful mazourka and Weippert-led band
Leave the plain country-dance people all at a stand.
There 's more mirth in the jig and the amateur's strum,
When the parchment-spread battledore serves as a drum.
When Apollo and Momus together unite;
Till the household-room rings with laughing delight.

Other rooms may be thickly and gorgeously stored
With your Titians, Murillos, Salvator, and Claude;
But the Moreland and Wilkie that hang on the wall
Of the family parlor out-value them all.
The gay ottomans, claiming such special regard,
Are exceedingly fine, but exceedingly hard;
They may serve for state purpose, but go, if you please,
To the household-room cushions for comfort and ease.

THE USE OF SALT TO MAN AND ANIMALS.

Common salt, or muriate of soda, is the salt which has been longest known. Its effects upon man and animals are striking and important. In moderate quantities it seems to be a natural stimulant to the digestive organs, and is supposed to furnish the necessary supply of soda to preserve the bile in an alkaline and anti-septic condition. The estimation in which salt was held amongst eastern nations is very remarkable, and may be traced to the highest antiquity. There appears, however, to be one portion of the globe in which salt is despised by many of the people. "It much surprised me," says a traveler, "to see some of the South American aborigines eat their provisions without salt, though they have it in great abundance. If you offer them any food that has the least grain of salt in it, they spit it out with great disgust." There are many countries in which salt has never yet been found, and where, owing to the little commercial intercourse, the inhabitants can only occasionally indulge themselves with it as a luxury. In the interior of Africa this is particularly the case. "It would appear strange to an European," Mungo Park observes, "to see a child suck a piece of salt as if it were sugar. This, however, I have frequently seen, although the poorer class of inhabitants are so very rarely indulged with this precious article. To say that a man eats salt with his provisions is the same as saying he is a rich man." This celebrated traveler suffered great inconvenience from the scarcity of salt; and any European who has been accustomed to its use, experiences a painful longing for it when deprived of it. Moorcroft and Trebeck, in their "Travels in the Himalayan provinces," tell us that the Ladakhis and Thibetans boil soda and fossil salt with their tea, of which they drink large quantities in the course of the day. It is important to be known that one of the ill effects produced by an *un*salted diet is the generation of worms. In the *London Medical Journal*, (vol. xxxix.,) Mr. Marshall has published the case of a lady who had a natural antipathy to salt, and was consequently most dreadfully infested with worms during the whole of her life. In Ireland, where, from the bad quality of the food, the lower classes are greatly infested with them, a draught of salt and water is a popular and efficacious cure. Dr. Paris has noticed the bad effects of a diet of unsalted fish. Rush says that he has administered many pounds of common salt with great success in worm cases. Lord Somerville, in his address to the Board of Agriculture, gave an interesting account of the effects of a punishment which formerly existed in Holland. "The ancient laws of that country ordained criminals to be kept on bread alone, *un*mixed with salt, as the severest punishment that could be inflicted upon them in their moist climate. The effect was horrible; these wretched criminals are said to have been devoured by worms engendered in their own stomachs." The wholesomeness and digestibility of our bread are undoubtedly much promoted by the addition of salt, which it so universally receives. Dr. Dyer says that, in the Mauritius, the planters' slaves rarely obtain salt, and are therefore extremely subject to worms, while the Government slaves and the convicts get salt in their rations, and seldom suffer from those intestinal parasites. Some planters, regarding economy and the health of their slaves at the same time, give a table-spoonful of salt in half a pint of water to each slave regularly every Saturday after work; and they find that this dose acts not only as a vermifuge, but as a tonic. A naval surgeon, who used to prescribe salt water for his patients in all disorders, happened to be drowned one evening. Next day the captain, coming on board, inquired for the doctor, and was coolly told by a sailor that "he was drowned last night in the *medicine chest*."

The fondness of animals for salt is often remarkable. Professor Gmelin tells us that a female wild ass which he brought to St. Petersburgh preferred brackish water to fresh. In their wild state, asses feed chiefly on the most saline and bitter plants of the desert, as the *kalis, atriplices, chenopodium*, &c. Bryant says they will discover distant waters by the smell; and one may infer that they do this by inhaling the saline emanations from them. Sir Thomas Bernard, in his interesting work, entitled "Ease of the Salt Duties," says—"In visiting Alderman Farley's salt-works at Droitwich, in August, 1817, I was struck with the appearance of an old black horse, that worked the machine for raising the brine. He was in very good condition, and his coat was like the finest black satin. I asked what made the horse so sleek and plump; the answer was, that he had regularly a little salt in his chaff three days in the week, about four ounces of it on each of the three days; or, if he was not very stout, then sometimes a little more; but that, in general, the horse was very well, and did his work well. He said he did not give him the whole four ounces at once, but at several times, about a table-spoonful each time. The horse had been purchased by Mr. Farley about four years ago, being then about twenty years old, and his health and appearance, though he had constant work, had very much improved since; the salt, he added, had made him eat his food, and work better." Mr. John Taylor, the agent of the London company for working the Real del Monte silver mines in Mexico, informed Dr. Paris that the ore, which consists of the sulphuret of silver, is, together with mercury, amassed in heaps with iron pyrites and common salt; and that such is the greediness of the mules employed in the works for salt, that they are constantly licking the materials; the consequence is, that a portion of the silver amalgum is introduced into their stomachs. The animals, however, suffer no inconvenience; but, after death, on opening their stomachs, it is not unusual to find considerable masses of silver, the mercury having escaped, or been dissolved by the gastric juice.

Camels, according to Mr. J. Wilkinson, will drink water which is too salt to be drank by the

Arabs. Gazelles live in immense herds upon the open plains, where they browse upon the saline and pungent herbage. The Americans call the salt springs *deer-licks*, because the deer and elks (*Cervus Alces*) frequently repair to them, not only to eat the saline herbage, but to lick the wet pebbles. They come in such numbers to these salt localities that the ground about is trodden into mud by them.

Pliny only alludes to salt as a beneficial ingredient in food for grazing. In his "Natural History," (Book xxi. chap. 7,) he tells us that cattle have an avidity for a salt pasture, and that cows fed thereon give more milk, and much better for curding into cheese, than upon ground not of a saline nature. In some parts of Africa, large herds of cattle travel from great distances, at stated seasons, to enjoy the marine plants which grow on the coast and are saturated with sea salt. The fattening property of our own salt marshes is well known to graziers and farmers. In Smith's "Wonders," it is stated that the water of the salt mines near Eperies, in Upper Hungary, afford "a blackish salt, which is generally given to cattle." For many years, it has been the custom in Germany, and particularly in Wirtemberg, where a vast number of oxen are bred, to give doses of glauber salts to cattle. As long as common salt is more expensive than glauber salts, it was thought that the inhabitants of Wirtemberg used the latter through economy, but this supposition must have been erroneous, as they still continue to use glauber salts, although the discovery of salt springs has rendered the domestic salt exceedingly cheap.—The reason they assign for this preference is, that it conduces, by its purgative qualities, to keep the cattle in good health, and that even when, from long habit, they become less liable to be acted on by it, it still promotes digestion, and brings the beasts into good condition more rapidly. Two doses are generally given each week. A horse has an ounce and a half; an ox or a cow receives an ounce; and sheep three quarters of an ounce; and a pig about half an ounce. Should its purgative effects prove too strong, the dose is diminished. There is no trouble in administering the salt, as it is merely sprinkled over the food. The price of it in Germany is a mere trifle, as the mines of Bouxviller, in the department of the Lower Rhine, furnish it from the manufacture of ammonia in great plenty. Matthew Aphonin, a Russian naturalist, remarks that "oxen fatten very quickly upon the sea-coasts where the arrow-grass, (*Triglochin maratimum,*) their favorite food, abounds;" and if this be so, it is probably ascribable to the saline nature of the plant, and to the sea-breezes containing particles of salt, which appears to be necessary to stimulate their digestive organs, and therefore conducive to their health. In Upper Canada the cattle have plenty of wild pasture to browse on in the woods, but, once in a fortnight they return, of their own accord, to the farms, to obtain a little salt; and when they have eaten it mixed with their fodder they repair again to the woods. D'Azara tells us that in some parts of Paraguay, salt is not given to the herds of cattle; but they are supplied with the *barrero*, (a saline or nitrous earth,) which they and other animals seek with avidity, and without which they fail and die in the course of four months. From the 27° of south latitude to the Malovine Islands, they have no need of the *barrero*, because the water and pasture-grounds are sufficiently salt; but northward, beyond this latitude, it is necessary, and the plains which do not contain it feed neither the ox, horse, ass, mule, goat, or sheep.

Dickson, in his "Husbandry of the Ancients," tells us they were accustomed to prepare the straw for feeding stock by keeping it for a considerable time steeped in brine; that it was then dried, rolled up in bundles, and given to oxen instead of hay. In Spain, the practice is of great antiquity, (for we remember reading of it in some Latin author,) and in the low countries, where they have no traditional data to ascertain its first introduction among them. Dr. Brownrigg, in his "Art of Making Common Salt," (1748,) remarks that "salt provokes the appetite, strengthens the stomach, promotes the concoction and digestion of the aliments, &c. and is most friendly and agreeable to the human body. Moreover, black cattle and sheep take a pleasure in licking it, and by it are preserved from many diseases; they also thrive to admiration upon it." The *Museum Rusticum* (1763) confirms this by the practice which had long before been pursued in America, "where," says the American contributor to the above work, "we think it in a manner absolutely necessary, and, accordingly, give it to almost every kind of cattle, and those with parted hoofs are particularly fond of it. To this practice of feeding with salt it is generally ascribed that our cattle are so much more healthy than the same animals in England; certain it is that they are subject to much fewer diseases." The first experiment as regards sheep, instituted in England, seems to have been in 1801, on the estate of the Board of Agriculture. Lord Somerville's account of this experiment is exceedingly interesting and important, and too little known. "The salt," his Lordship relates, "is given in the morning when the sheep are looked over, in order to counteract the ill effects of the dew. On an average, one ton of salt is annually consumed by a thousand sheep. A small handful of salt is put on a flat stone or slate; and ten or fifteen of these slates, set a few yards apart, suffice for one hundred sheep. At first, the sheep may be moved toward them; if they feel a craving for salt, they will lick up quickly as much as is necessary; if they do not want it, what remains dry when the sheep are next looked at is taken up and reserved for future use. Twice a week has been usually found sufficient; in particular cases it may be offered thrice. Of a flock approaching to one thousand, there are not ten old sheep which have not taken kindly to it, and not a lamb which does not consume it greedily.—When turnips, in the early season, are stocked with sheep, and the greens are rank and strong, many die suddenly, especially two-toothed sheep; the disorder arising from excess of fermentation in the stomach. In this disorder, hay and salt are devoured with a greediness that denotes their salutary effects. In the rainy and unfavorable autumn of 1801, we did not lose one sheep in turnips, and, probably, *never shall*, while we persevere in the use of salt. In the autumn of 1802, we had many hundred fat wethers, ewes, and hog sheep, in turnips, and lost two the first month the turnips were stocked.—Certainly the chances were that in any keep, and any season, more might have died out of so large a flock. In strong pastures, when seasons are wet, the rot often spreads destruction over whole tracts of the country; in such a case, salt must be beneficial, and an object of national importance. It is supposed, and with great truth,

to correct acidity in the stomach—a disorder common to sheep even in Spain, but of a much more serious nature in the damp climate of Great Britain, more particularly when stocked on green, floaty food, such as turnips, vetches, and young clover. Salt may not be a specific on land naturally unsound—such land it is madness, at any rate, to stock with sheep; but where the rot occasionally prevails, those who have carefully noted how salt affects cattle, can hazard little in supposing that the disease will be much less heard of when such a corrective is applied." There can be no doubt that salt is a great preventive of the rot, and of those parasitic creatures called *flukes*, which attack the liver of the sheep. The flocks that feed on the syenetic hills of the Cheviot, and adjacent and similar soils, the shepherds say, may pine, but cannot rot. "In visiting Mr. Mosselman, who occupies a large farm on the Continent, I was surprised," says Sir John Sinclair, "to find a quantity of rock salt from Cheshire. He assured me that, by allowing the sheep to lick it, the rot was effectually prevented." In Spain, salt is given as a medicine for the rot. Sir John also tells us that a Mr. Bracebridge "drenched some rotten sheep, night and morning, with strong brine, after which he did not lose one; they became fat, and the meat was fine and good, as if the animals had never been affected." Mr. Curwen says that, after his first trial of salt upon sheep, out of fifty shearling Devons which he killed, there was not one unsound; whereas, previous to the use of salt, it was rare to find a liver that was not more or less tainted. In short, salt keeps a flock healthy, does no harm, and the expense of providing it is but small. The Saxons and Spaniards attribute the superior fineness of their wools wholly to their liberal use of salt. Every sheep ought to have two ounces of salt per week, spread very thin upon tiles or slates in the field.

To cold-blooded animals, inhabiting the land and fresh water, salt seems always to prove fatal. The Prince of Musignano, an able and celebrated zoologist, says of the warty newt, (*Triton cristatus*, Lawr.) that if a little salt be sprinkled upon it, it dies with the most violent convulsions, although this amphibian is generally so highly tenacious of life. Salt proves equally fatal to earth-worms, snails, slugs and insects. Hence salt and water, poured over gravel walks, preserves them in good order, by destroying the worms whose earth-casts are so unsightly. To destroy insects, salt is best administered with a garden syringe. [Jour. of High. & Ag.Soc. of Scot.

ON THE CURING OF PROVISIONS FOR THE BRITISH MARKET.

L. Tucker, Esq: The curing of meat is a business we are daily engaged in; an art attained by precepts and founded on principles, the knowledge of which is of immense importance not only to the health, but to the comforts and economy of man; yet strange to say, it is a science about which not one word has ever been written; and that we look in vain through the printed masses of the new and old world, for a single treatise upon the subject. When you reflect upon this fact, you and your readers will, I trust, be lenient in your criticisms on this, *my* first attempt at a *first* essay on the subject; more particularly when I tell you, I am prompted by no other motive than to increase the value and interest of your invaluable publication; to instruct your readers, and to open the eyes of the many persons engaged in the business to the minutiæ that must be observed, and the difficulties that must be overcome, in order to pursue the trade successfully.

Ude, in his celebrated book on Cookery, in giving instructions how to make hare soup, significantly says, "first catch the hare." It is not of more importance to catch the hare to make the soup, than it is, in putting up beef for the British market, to first get the beef of the right size and quality. The quality is found among the fattest and best fed cattle you can obtain; and the size must range between 600 and 800 lbs.—being that which invariably cuts up to the best advantage; having more prime pieces, both in weight and number, compared with the whole weight of the carcass, than any other size we can select. Having obtained the cattle, our next care must be to have them properly killed; and here it is of great importance to your success in curing, that not only the blood of each animal should be well and thoroughly drawn, but that every animal should be allowed sufficient time to rest off its journey—say from 24 to 48 hours, according to circumstances—so as to allow the fever consequent on driving any distance to subside before you kill it.

The business of packing is divided into two parts; the first is to cure the meat—the second is to preserve it when cured. In the packing-house, the first preparation that should be made for business is the making of the brine in which the beef is to be cured. By way of parenthesis, it may as well be here noted that neither Kanawha, Zanesville or Goose Creek salt should be allowed to touch your meat, either directly, by mixture with other salt, or indirectly through the medium of brine; for so sure as any of these salts are used, so sure will your meat become slimy like fish, and be imperfectly cured. The best salt I know of, for curing, is the Liverpool coarse sack salt, as it is called. The brine should be made for at least 10 or 14 days before it is required; it should be made in large vats or hogsheads with a sufficient quantity of finely powdered saltpetre added, to give the beef that red color which so pleases the eye from long habit; it should be allowed to settle down and refine, and, when drawn off into the tubs where the beef is to be cured, it should be clear, and entirely free from any sediment or impurity.—The strength should also be tested—which, in the absence of a regular brine tester, may be

done accurately enough by placing the half of a hog's head, weighing from 7 to 8 pounds, in the brine, which must float *perpendicularly*, the snout two inches above the surface, before the brine can be pronounced strong enough.

The next operation in the packing house is the cutting up of the beef into 8-lb. pieces, about which it is impossible to give any specific directions, as the number of pieces must entirely depend on the size, weight, and thickness of the animal. This department of the business must be guided by the hand and eye of the practical tradesman, and directed solely by his good judgment. One thing may here be remarked—that it is always well to leave two prime pieces of every carcass, say off the standing ribs, whole and uncut, to weigh from 32 to 38 lbs. and cured in that way, for two reasons: first, when cut up to the proper size after they are cured, it leaves a freshness and bloom on those pieces for the heading, which gives to the purchaser, on opening the tierce for inspection, a certain guaranty that the meat was handled by a tradesman; and secondly, it will facilitate the scaling of the meat much, as should 37 pieces be in the scale, wanting one piece more to weigh 8 or 10 lbs. more or less, that piece can be cut off this larger one to a great nicety, and avoid the delay and trouble of tossing a pile of meat over to hunt up one piece from the many, of the exact weight wanted. In scaling your meat it is not necessary to put more than the exact weight, 304 lbs. in, as beef, when cured, and put into tierces, will regain fully 5 per cent. of the 10 per cent. it will have lost in the process of curing.

As your beef is cut, the coarse pieces of the fore quarter, such as the clods, stickings, and shoulder pieces, should be selected and well rubbed with dry salt, and put into pickling tubs by themselves; the round, rump, and jump pieces of the hind quarters should in like manner be selected, well rubbed with dry salt, and put into pickling tubs by themselves, and then your prime parts, such as ribs, sirloins, plate and brisket pieces, should be selected, and put into the pickling tubs by themselves, and *without being rubbed*. Those pieces being the most tender and least veiny parts of the beef, will cure more easily and quicker than the coarser parts, but after remaining a week in the brine they should be drawn, and if the brine has not sufficiently stricken, then and not till then, should those pieces be rubbed with dry salt.—The coarser pieces should be drawn and examined every fifth day at least, and if the salt should not have sufficiently stricken, and the impurities be not well extracted, then they should be *gently rubbed* a second time, and the air allowed to act for an hour or two at least, on the meat and salt, before they are returned into the brine; the whole of the meat in the curing tubs must be well covered with brine, and the air entirely excluded from it.—Under a good state of the atmosphere, and with proper handling of the meat, it will be cured and ready to put into the tierces in from 14 to 16 days, but of this the practiced eye and hand of the tradesman can alone be the judge, for I know of no words to explain the feel and look of meat when cured, or when not sufficiently cured; practice and comparison alone, aided by close observation, is the only certain way of arriving at that judgment.

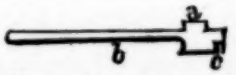
The propriety of sorting the meat of the three qualities as pointed out, and having each quality cured separately, I shall endeavor to explain, so as to be understood and appreciated by every person possessed of any common sense and experience. First, the finer or middle pieces of every animal, it is well known, are much more easily cured than the coarser pieces of the extremities of either the fore or hind quarter, hence the propriety of keeping them separate, as nine times out of ten it is wholly unnecessary to do more to them (the finer pieces,) than simply to place them in the brine, where they will cure without any rubbing, while it is necessary to rub the other pieces once at least, and sometimes oftener with dry salt, in order to extract thoroughly those impurities which the *lean* of every animal contains in a very much larger proportion, than the fatter part of the same animal does; and it is, for the same reason, right and necessary to separate the pieces cut off the extremity of the fore quarter from those cut off the extremity of the hind quarter, because the meat of the fore quarter contains more of those impurities, which must be extracted before it is cured, than does the meat of the hind quarter, and consequently the meat of the fore quarters requires more care and handling in order to cure it, than does the meat on any other part of the carcass of the animal; hence this classification will enable the curer to give to each sort of meat the required handling necessary for its preservation, without interfering with the other parts, which, if treated in the same way, (I now speak of the finer pieces,) would have their natural juices extracted, become hard, and what is commonly but erroneously called over-cured. There is also another reason why this classification should be made; it is this: That it saves much time and labor, when the meat is selecting for the scale, by having each quality in separate bulk; the selector has but to go to either, in order to lay his hand at once upon the particular piece he wants, without losing time or wasting labor in tossing over a pile of meat promiscuously cured.

When your meat is cured, the next process is the packing it away for preservation into the tierces, about which I deem it unnecessary to say anything; because when the meat is selected and scaled, the packing is a mere mechanical process, in which a man can alone become a proficient by practice and experience. It may be well, though, to remark that when your meat is taken out of the curing tubs, it should be washed, and ridded of the impurities extracted by the salt, and generally in a greater or less degree deposited on the surface, and which can be best and most easily done with the aid of water and a good hickory broom; the packer should always have by him a knife, and whenever he observes an incrustation of those impurities on the meat, which the washing had not taken off, he should use his knife to scrape it off, and if scraping did not effect it, he should cut it off.

When your tierces are packed, they must then be headed and thoroughly driven down in their *wooden hoops*, rolled by, and each tierce have its bung-hole bored, and then brined with pure, clean brine, made and tested in the way before described, except that *no saltpetre* should be put in it. It is of the utmost importance that this brine should be made several days before, in order that not only the impurities of the salt, but those of the water also, should have time to settle down into a sediment, and this sediment should not be disturbed when the brine is drawn off. The want of this precaution has

been the cause of much complaint and injury to the meat when exposed for sale, from the fact that when the brine was put on without first being allowed to clear itself, the impurities of both the salt and the water settled upon the meat, and made it both slimy and dirty. The tierces should remain at least 14 days in this state with the bungs open, and whatever the casks may have absorbed of the brine, should be replenished once, if not twice, every day, and this continued until the casks will absorb no more, and that the brine remains as stationary and undiminished, when filled, as though it stood in a glass bottle. The necessity for this precaution is obvious: first, if your staves are not in this way allowed to become saturated with brine, and the brine replenished, before the casks are finally coopered and shipped, you can have no guaranty for your casks not leaking on the voyage; and secondly, should this absorption be allowed to take place on the voyage, your tierces in a short time will become half empty of brine, and wherever your meat then comes in contact with the stave, it will extract from the wood its coloring matter—will become stained and discolored, and for the want of brine, the meat will become hard and rancid, and perhaps mouldy too. Your tierces after standing at least 14 days will take no more brine. They are then ready for the bungs, which should be put in with a coarse cloth around them, and tightly driven; over each bung a piece of tin should be nailed on, but great care must be observed that the tacks with which it is fastened are so short as not to go through the stave; as, if they do, a leakage will take place that may do much harm.

Then comes the finishing stroke to the whole, namely, the putting on of your iron hoops, and the final coopering of your tierce. As few coopers are in the habit of doing such work in the United States, I shall explain the process, so that all may understand and perform it, if they will. In the first place, care should be taken to clean your house of all salt and brine, in order that the hoop-iron may be kept as free from it as possible, to prevent its rust and corroding. The tierce up-ended, the cooper takes off the first three wooden chime hoops, he then takes his hoop iron and bends it round the place of the *first* hoop, and takes its accurate measure; there he then cuts it to the length, and rivets it, which can only be well done on the face of a small anvil, or on the side of a metal half-hundred weight; he then puts this hoop on, (having eased it, by a few blows on the inside of one edge, to the shape of the cask,) and drives it to the berth of the *second* wooden hoop, leaving room for a wooden guard-hoop on the outer edge of the chime; he then strips that end of the tierce of all the remainder of its wooden hoops, and takes his hoop-iron and measures around the berth of the *third* wooden bulge-hoop, cuts, rivets and shapes it, and then puts it on and drives it down to the place of the *second* bulge-hoop; this done, he then puts on his wooden guard bulge-hoop, which passes over the iron one, and drives it to its place, and then drives on the remainder of his wooden hoops, finishing with a guard chime-hoop outside the iron one, and so proceeds on until the whole is coopered. It is necessary here to remark, that no iron driver, used perpendicularly, as coopers use their wooden drivers on wooden hoops, will ever drive an iron hoop to its place. There is a proper driver without which the hoops cannot be driven; it is this:



B, the handle; *a*, the head on which the blow is given, and *c*, the bite which catches the edge of the hoop; this, used with a 7-lb. hammer to strike with, will drive any iron hoop to its place, but without it, the hoop cannot be stretched and driven, and consequently must remain imperfect.

The curing and packing of pork differs somewhat from that of beef; but the length to which this article already extends, prevents me from going into that subject at present, nor is it necessary to be known to the community, for from my knowledge of the trade, of the quality of the Irish pork, and of the manner and cheapness with which it is produced, I deem it impossible for us in the United States to compete in any market with the Irish pork, with the hope of realizing a profit for some years to come, under the present Tariff; nor can we count with certainty, even under the very best possible management, upon any profit being realized by putting beef up for the British market this year, at the prices now paying for fat cattle in this, the great beef producing country of the United States.

At some future period I may again address you on this subject, which is of such interest and importance to the whole of our community here. I remain, sir, with respect, yours, &c.

AN APPRENTICED PACKER.

Louisville, Ky. 4th Nov. 1845.

SOME EXPERIENCE WITH GUANO IN VIRGINIA THE LAST SEASON.

Extract of a letter from a gentleman in Maryland.

"We have a fine trial of Guano on the Alms House Wheat which I will show you when you come on. Mr. T. S. Pleasants writes me from Petersburg, Va. 20th inst. wanting to purchase more Guano of Mr. George, and remarks: 'I have never been able to collect the results of any exact experiments with Guano, or I should have forwarded them to thee with a great deal of pleasure. Some of those persons who tried it on wheat, thought the increase was very considerable. Dr. Dupuy, according to the best estimate he could make, thought the increase of his was not more than thirty per cent.; Robert Strachan thought his was enough to pay for the Guano three times, but the season was every way unpropitious for its action, and whilst some persevere, many more are not disposed to try again. Although the past season has been so discouraging to those who have used Guano, I cannot say that my confidence in its virtues has been impaired, and I feel no hesitation in making another trial. For the very early and the very late crops, its action has been beneficial, but for those which usually mature during the summer and early part of the fall, its application was attended with no benefit; indeed, in some cases, as in that of hot fresh manure, some injury might have resulted. My crops of cabbages, of which I raise a good many for the market, are very fine and grown entirely with Guano.'"

A SKETCH OF BELGIAN HUSBANDRY.

THE farms in Flanders are small, the average size being not more than fifty imperial acres. Some are held on lease, others are not. The terms vary from three to fifteen years, some multiple of three as far as fifteen being the duration of a lease. In some the tenants have it in their power to quit at the end of every third year, while the landlord cannot put him away till his lease is out. It is impossible to say what the average rent of the farms is; but so far as I could ascertain, it may be stated at 30s. the imperial acre, for the best soils, exclusive of burdens, which are generally one-fifth of the rent.

The farmers of Belgium are a hard-working class of men—in the habit of laboring their farms, and generally ignorant of every other subject but their profession. But in it truly they show rare sagacity and experience; and though unaided by, and almost despising, the light of science, they discover in some parts of their system of Agriculture a perfection to which science has never yet guided the farmers of this or any other country. When we look back to the ancient grandeur of Belgium, when its cities were the marts and factories of Europe, and consider the consequent increase of population in a country naturally unproductive, we will discover a sufficient stimulus to excite the energies of a people gifted by Nature with an indomitable perseverance and unwearied industry. This disposition, as well as its effects—their Agriculture—has been handed down to the present generation of farmers, and still manifests itself in many operations which the negligent farmer would consider unprofitable, or, at least superfluous; and it is from this praiseworthy industry that Belgium, comparatively a poor country, is considered by strangers as unrivaled in the salubrity of its climate and the fertility of its soil, and that the great part of the kingdom is prevented from returning to its original barrenness.

The number of servants who live on the farm throughout the year may be stated at six to the fifty acres, and these are paid as follows:—The men who perform the work of plowmen and laborers receive 10s. a month with their meat, which the farmers value at 6d. or 7d. a day, thus making the full wages of a man equal to 25s. a month or £15 a year. Their food consists of boiled milk and bread for breakfast, soup or butter-milk and bread and butter for dinner, with potatoes and pork five times a week, and bread and milk for supper. The soup used is composed, according to Mr. Radcliff, of butter-milk boiled and thickened with flour or rye-bread, potatoes, salt fish, various vegetables, and eggs. They work from daylight till it is nearly dark at this season of the year, which, after deducting the hours of rest, will be about ten hours a day. In summer it is longer. The women, who are hired to live on the farm, receive about 4s. 6d. of wages less in the year than the men. It may be observed that almost all the farmers take the same food as their servants. The day-laborers, who are only employed at certain seasons, such as for weeding the crops and engaging in the operations peculiar to flax culture, receive 7d. and 8d. a day, with their meat; and boys and girls have 5d. with their meat. An ordinary working-man will live very comfortably in a town in the south of Belgium, paying £15 for victuals and £2 for the rent of one room for the whole year.

The farm-buildings are generally built in the form of a square, and consist of dwelling-house, byre, barn, stable, servants' sleeping-room, and cart-shed. The middle of the area included in the square is several feet below the level of the houses, and is admirably adapted for saving manure. The greatest cleanness prevails in every department of the steading.

The strength of horses kept on a farm is at the rate of a pair of horses to the fifty acres. And the number of animals supported altogether on the farm far exceeds anything we are accustomed to in this country. This, indeed, is one of the secrets of their farming; and we have no hesitation in saying that, in this particular, they excel the farming of any country with which we are acquainted. The keep of a horse is estimated at 20d. a day. It is generally fed during the winter on oats, straw, beans and hay; and in summer on cut grass. The horses are small, but compact, handsome, with beautiful action, and high-spirited. As no attention has been paid to the improving of their breed of cows, they are not distinguished for any excellences. They answer the purpose of the dairy, for which they are principally kept: they are generally black and white in color. After being for some years in the dairy, they are fattened or sold lean to the butcher, who is generally feeder as well as butcher. The most of the beef used in Belgium is that of these old cows. They have a practice by which they ensure the regular feeding of the calves, which they consider essential to quick fattening. Immediately after they have got their usual quantity of milk, baskets are put on their mouths, to prevent their eating anything in the interval between the feeding times. Few sheep are kept, and these are of the worst description.

The fields are small, and are divided merely by ditches. There is no such thing as a hedge or dyke enclosing a field. These, from the peculiar management of the stock on their farms, are quite unnecessary. But where thorns are used as fences, as around nurseries and gardens, the settings are put very closely together; and, after they have sprouted up a certain length, sticks are run along horizontally, and the young shoots are tied to these, so that in a short time, from the intertwining of the shoots, now grown into branches, the fence becomes quite impenetrable. Under-drainage is never practiced. Much of the soil does not require it: but to facilitate the drying of the fields, and to draw off the surface-water from the plants, a spading of earth is taken out from every furrow, and scattered over the ridge, so that, in a heavy shower, the rain-water finds a ready course to the ditches which skirt the fields.

One of the points in which the Flemings show their skill of management is the attention they pay to the working of the soil. Unless the soil has been thoroughly pulverized by repeated plowings and harrowings, they forbear from sowing any crop. To this, in particular, among

other causes, we must attribute the practice prevalent there of using small quantities of seed, and the beautiful, healthy, and equal brairds which cover the surface in spring. In many places they are not content with the mere use of the plow for this purpose, but resort to the spade also, either in giving an additional depth to the furrow, or in turning the whole soil over with this implement. In the province of Antwerp, we mentioned before that the spade was far more used than the plow for agricultural purposes.

An operation seen daily at present is the picking of the weeds from the young crops. Often the land is raked well before the workers commence their operations, for the purpose, as the farmers allege, of separating the plants, that the weeds may be more easily distinguished. But there is evidently another and more beneficial effect, the raking will have upon the crops. It will loosen any crust that may have been formed on the surface, and thus admit of a more ready access of the air to the roots of the plants and the quantities of manure which are covered by the soil, thus aiding their action by a supply of oxygen. Some may object to the raking, from its exposing the plants to the action of drouth; but the good derived from it, for the reasons stated, is more than sufficient to counterbalance any risk from drouth. After the raking, the workers go over the whole field on their knees, picking out every useless plant. This is perhaps repeated several times in the season, according to the state which the field is in. Flax costs far more labor in weeding than any other crop; and the Flemings spend double time on it from the importance of the crop. A Scotchman, ignorant of Agriculture, in passing through Belgium at this season, and seeing an extended row of women creeping on their knees among the young crops, and looking with the greatest care for injurious weeds, would be apt to extol the industry of the people, while he would accuse his own countrymen of indolence and carelessness in the minute, but no less important, points of husbandry. But he would be doing his own countrymen an injustice, in as far as he would condemn them for their non-performance of what they do in a more economical and as effectual a manner as is to be met with in Belgium; we allude to the practice of drilling grain crops, by which means the weeding of the crop is far more expeditiously accomplished than it is by the plan resorted to in Flanders. This careful attention to the weeding of the grain crops is the more necessary in Belgium, where they are all sown broadcast; the soil is of that class which encourages the growth of annuals, and summer fallow or green drilled crops form rarely a part of their rotations.

The implements used in Flanders are so simple and rude that they scarcely deserve mention. There are two kinds of plows employed; one which is held by one hand only, and is of the rudest construction; and the other, called the Walloon plow, in which the body is attached, by means of its beam, to a framework on wheels, which connects it with the horses, and regulates the different depths to be plowed. In this the mould-board is movable, and is changed at the end of every furrow from one side to the other.

The next subject of which we shall speak is the manures of Flanders; and some conception of the importance of this subject may be formed, when we mention that it regulates, not only the whole, but every individual part of the management of a Flemish farm. The first object and great aim of a Flemish farmer is to make or get manure; and to carry this into effect, nothing that can contribute in the least to increasing a dung-hill is thrown away. He cultivates food for cattle, and ties them up all the year round, that he may not lose any of the manure. He sows rape, and allows it to blossom and ripen, that he may obtain the seed for manure. His ashes-cart and urine-barrels traverse every street in a town, every by-way in the country, to collect this important necessary for his farm. It is in their management here that the farmers of Belgium excel those of every other country, and are thus enabled to extract more from the land than any other body of farmers. They act up, in short, to the true old adage that "Muck is the mither o' the meal kist." The principal manures used are farm-yard dung, urine or liquid manure, rape-cake, and ashes. Minerals are seldom, if ever used, and bones are almost unknown. I alluded before to the comparatively great number of animals kept by the Flemish farmers on their few acres. This they do principally for making manure, to enable them to carry out their system of farming. On a farm of 63 acres, 3 horses and 15 milch cows, and several heifers for supplying the stock were kept throughout the year, besides 6 cows and a few calves that were fattened yearly. In another, of 77 acres' extent, 4 horses and 20 cows, with a requisite number of heifers, were kept, besides from 20 to 30 calves being fattened off yearly; and in a third, of 88 acres, 5 horses and 20 cows, besides heifers and calves, were kept. These farms were all arable, and were situated in one of the finest districts in Belgium. Mostly every crop receives some of this farm-yard dung, which is always well rotted before being applied. One of the peculiarities of the Flemish system is, the extensive and various uses they make of the urine from the animals kept on their farms. Every one has heard of the urine-tanks of Flanders, which are to be found all over the country, at home, and in the fields. They are built in a most substantial manner, and so far under ground, that when they are covered in, the farmer is enabled to cultivate the soil over them. Contracts are generally entered into between the farmers and those in towns who have much of this at command, such as brewers, distillers, &c., who fatten animals from the refuse of their works. £2 ($10) is *commonly given for the urine of one animal for a year.* The farmer, at stated periods, conveys, by means of barrel-carts, what is collected in towns to his subterraneous receptacles at the corners of his fields, to be ready for the seed time. The crop to which it is principally applied is flax; and then they dissolve in it rape-cake, which renders it a most powerful manure. After the flax-seed has been sown and covered in, and rolled, so that the surface is made quite smooth, they proceed to apply this mixture. It is applied in the following manner:—Five men are employed altogether, two to pump, two to scatter it, and one to drive it. A rectangular piece of ground, thirty yards in breadth, is measured off across the ridge; this is sub-divided into six portions of five yards each. The field was laid off in ridges of ten yards. Six wooden vessels are filled, and placed in the middle of a ridge, at a distance of five yards from one another; so that the contents of each vessel, which is about the size of a potato firlot, is the allowance for

every fifty square yards. There is nothing in which they manifest such economy as in the saving of this material, which they prize as a most valuable assistant to their labors. Rape-cake, besides being applied, as mentioned above, with the liquid manure, is also used in a dry state. The rape is cultivated principally as a manure, and is used extensively where the cropping is very severe. Ashes are never used but as a top-dressing to clover; but the traffic which is carried on in them, between Holland and Belgium, is sufficient to form a distinct trade with a certain class of merchants in Belgium. The farmers in Belgium set a high value on them, and place so much dependence on them for the success of their clover-crop, that (I understand from what I have read) there is a current saying among them, that "He who buys ashes for his clover-crop, pays nothing; but he that does it not, pays double." It is really surprising that this manure, which has been proved to be so efficacious by a class of experienced farmers like the Flemish, has never yet been tried, or at least sufficiently tested, in Scotland. I believe some were imported in the beginning of this year by Messrs. John Mitchell & Co., in Leith; but I am not aware that they have met with the reception we would anticipate from the well-known successful results of their application in Belgium. There is nothing so much wanted at present, in the Agriculture of Scotland, as a good lasting top-dressing for clover. The failures in this crop have been frequent of late, and the effects of nitrate of soda last only with the crop to which it is applied, while sad disappointments have been experienced in the use of gypsum. But before recommending an extensive use of this material, I would suggest a few comparative trials to be made with it, gypsum, soot, and other substances; for if the failure of gypsum arose from there being a supply of it already in the soil sufficient for the growth of the plant, an application of Dutch ashes might be attended with a similar result, as the great proportion of the ingredients of the ashes are salts of lime, with the useful addition, however, of some salts of soda. Some attribute their great effects in Belgium to the lime which they contain, as few of the soils there have any amount of lime in their composition. They are applied in different quantities to the soil, from ten to thirty bushels an imperial acre.

The crops raised in Belgium are wheat, oats, rye, flax, potatoes, rape, and clover, as principal; and, as secondary, turnips, carrots, buckwheat, tobacco, and spurry. The farmers consider flax and rape the best paying crops they cultivate, and they are the most exhausting; hence the enormous quantities of manure given them.—The rape is sown in July, transplanted in September, and cut in June of the next year. The clover, which is grown for seed as well as for food for cattle, is an important crop with the Flemish farmer. He is not particular among what he sows it. We find it growing amongst flax, wheat, oats or rye. There are two varieties of rye used, winter and spring. The winter variety is almost always sown after potatoes in December, and some of it is cut green in spring, before the clover is ready for cutting. It thus answers the purpose of early tares in this country. Another crop is taken the same year, after it is cut. The ground is plowed several times for potatoes. When the last plowing is finished, the furrows of which are about seven inches wide, one man walks up one of the furrows, and, with an instrument similar to that used for picking up turnips, makes a hole, into which a boy drops the cutting of a potato.—Eight inches farther on, another potato-set is put, in making the hole for which he draws the soil over the previous setting. This he does every second furrow, so that the distance between each row of potatoes is not more than fourteen inches. One man and a boy do about 450 yards in this manner in an hour. The turnips are almost always taken as a second crop in the year. Immediately after the rye is cut, they begin to prepare the land for turnips; and, by the powerful agency of the liquid manure, a beautiful braird is obtained in a few days. The turnips have attained a pretty good size when they are pulled, and, with the potatoes, form the winter food for the animals on the farm. Carrots are often sown with flax, so that they are enabled to have two crops the same year from the land; for by the time the flax is pulled, the carrots are considerably advanced. This method of double cropping is very frequent in Flanders, and is another instance of what, by economy of manure and a judicious application of it, they are enabled to produce from the soil.

The next subject which comes naturally after this is the rotation of crops practiced in Flanders. I was prepared, before crossing the channel, to encounter some little difficulty in this subject, from having read of the great variety of rotations to be found there. Every field, Mr. Radcliff tells us, has its own rotation. But the four, five, or six years' course to which we are accustomed in this country, made me form but a faint idea of the difficulties of comprehending the Flemish course; and therefore, when I began to study them, these exceeded my greatest anticipations, and every day that I renewed my inquiries but plunged me into greater perplexities. I could perceive no fixed principle on which they founded their constantly varying rotations. The same farmer would give me one day one rotation, and the next another totally different from yesterday's, as the rotation he practiced on his farm; and were I to transcribe all the various systems I jotted down in my note-book, as those followed on farms within the narrow compass of a few miles, I would fill as many pages as this short sketch of Belgian farming would require. With such conflicting statements, and with no prospect of unraveling the mystery, I began to solace myself with the thought that the Flemings had no such thing as a rotation; that they knew the value of a change of crops each year, and therefore they practiced a succession rather than a rotation of crops. If they are rotations, it is difficult to tell where they commence and where they end; and they are, besides, extremely long. The principle they seem to go upon is, that the same crop shall not be taken two successive years from the same land. And on examining my heterogeneous mass of rotations, I have been enabled to trace out the few following facts:—That wheat and rye almost always succeed potatoes; and rye, potato wheat: the place of flax seems to be after oats, and before wheat or rye. Clover is sown with any of the principal crops. Rape seems to succeed oats or rye. I think I cannot do better than conclude this part of the subject in the words of Mr. Radcliff:

"In Flanders they would consider their industry and their manure inefficacious without the aid of a precise and well-regulated rotation; hence the variety of successions which we ob-

serve at every variation of the soil. They have been farmers time out of mind, rotation farmers for centuries: *there is not a cultivated acre, the proprietors of which are not matter of notoriety; and according to those properties, the most suitable succession and the most profitable application of manure have been long since resolved on, and are now invariably practiced.*"

It may not be out of place here to introduce the management of a farm in the high country, or Walloon district. The farms there are much larger than in the low country: 150 acres are there considered a small farm, and many of them are 1,000 acres in extent. The size of the farm about which I obtained most information was 200 acres. The whole of it was under the plow, but twelve acres of meadow. There were only three plows used: but twelve horses were kept, and used for farm work alone. The cause of this great number of horses is, that they never put fewer than four horses, and often six, into their wagons. They have, besides, twelve young horses of different ages, and fifteen cows, which is the whole of the stock kept on the farm. The rotation is generally potatoes, wheat, rye, oats, with clover sown with one or other of them. When we speak of this being the rotation, we do not mean that it is followed with unaltered regularity; for the most profitable crop here is wheat, which the farmer endeavors to grow on a third of his farm. They are near lime here, of which they avail themselves, by applying considerable quantities to the soil. I saw some applied as a top-dressing to young clover. Ashes are also used for the same purpose; but they are much redder in color than those I saw in the low country. The coal burnt here is always mixed with clay, to bind the pieces together, as it is all in small pieces, the largest not being larger than a hen's egg. This may cause the red color in the ashes referred to. They are not so careful of their manure as in Flanders, nor does the same attention seem to be paid to the land. Wages are much the same as those mentioned before.

This is a rough outline of Belgian farming, from personal observations there. I must admit that there is much that might be very profitably introduced and mingled with Scottish husbandry. A little more latitude and variety in our rotations would, while it would increase our productions, benefit the soil. But such a change would have to be introduced with caution, as otherwise it would shake the whole fabric of our Agriculture, which rests so firmly on its present foundation; and while we would cull out the excellences of Flemish farming, and engraft them on our own system, we would not commend it as a whole. And he who would attempt to introduce it into this country, either as a whole or in certain of its parts, would not only expose himself to ruin, but prove himself ignorant of the different states of the two countries, and of the first rudiments of good farming. P. M'L.

[Jour. of High. and Agri. Society of Scotland.

HOUSEWIFE'S DEPARTMENT.

THE FLOWER GARDEN.

FLOWERS are the ornament of vegetable existence, and have in all ages been cultivated by persons of leisure and taste, for the pleasure which they yield to the eye and the fancy. While generally healthful and exhilarating from being pursued in the open air, flower-culture is justly reckoned to be a pure and harmless recreation, which, by leading to the tranquil contemplation of natural beauty, and diverting the mind from gross worldly occupations, has a positively moral and therefore highly beneficial tendency. It has also the advantage of being alike open to the pursuit of high and low, the peasant and the peer, the over-toiled man of business and the industrious artisan. It may be followed with equal enjoyment by individuals of both sexes, and, as is well known, on every imaginable scale, from that of a single flower-pot or ornamental border, to the princely green-house and exquisitely varied parterre.

The natural grace, simplicity, and attractive coloring of flowers, have afforded endless themes to moralists and poets, and volumes have been penned to show how many associations of feeling, simple and sublime, these beauteous objects are calculated to excite. As our desire is to improve the feelings as well as to instruct the understanding, we hope to escape blame for pausing an instant over this agreeable view of the value of flower-culture, and would refer, for one of the most glowing eulogies on the subject, to the elegant work of Miss Sarah Stickney—the *Poetry of Life*. According to the well-expressed sentiments of this lady, few natural objects are more poetical, or more calculated to refine the taste than flowers: "From the majestic sun-flower, towering above her sisters of the garden, and faithfully turning to welcome the god of day, to the little humble and well-known weed that is said to close its crimson eye before impending showers, there is scarcely one flower which may not from its loveliness, its perfume, its natural situation, or its classical association, be considered highly poetical.

"As the welcome messenger of spring, the snowdrop claims our first regard, and countless are the lays in which the praises of this little modest flower are sung. The contrast it presents of green and white (ever the most pleasing of contrasts to the human eye), may be one reason why mankind agree in their admiration of its simple beauties; but a far more powerful reason is the delightful association by which it is connected with the idea of returning spring. Perhaps we have thought long of the melting of the snow that impeded our noon-day walk. But it vanishes at last; and there, beneath its white coverlid, lies the delicate snowdrop, so pure and pale, so true an emblem of hope, and trust, and confidence, that it might teach a lesson to the desponding, and show the useless and inactive how invaluable are the stirrings of that energy

that can work out its purpose in secret and under oppression, and be ready in the fullness of time to make that purpose manifest and complete. The snowdrop teaches also another lesson. It marks out the progress of time. We cannot behold it without feeling that another spring has come, and immediately our thoughts recur to the events which have occurred since last its fairy bells were expanded.

"It is of little consequence what flower comes next under consideration. A few specimens will serve the purpose of proving that these lovely productions of Nature are, in their general associations, highly poetical. The primrose is one upon which we dwell with pleasure proportioned to our taste for rural scenery, and the estimate we have previously formed of the advantages of a peaceful and secluded life. In connection with this flower, imagination pictures a thatched cottage standing on the slope of the hill, and a little woody dell, whose green banks are spangled all over with yellow stars, while a troop of rosy children are gamboling on the same bank, gathering the flowers, as we used to gather them ourselves, before the toils and struggles of mortal conflict had worn us down to what we are now, and thus presenting to the mind the combined ideas of natural enjoyment, innocence, and rural peace—the more vivid, because we can remember the time when something like this was mingled with the cup of which we drank—the more touching, because we doubt whether, if such pure drops were still there, they would not to our taste have lost their sweetness.

"The violet, while it pleases by its modest, retiring beauty, possesses the additional charm of the most exquisite of all perfumes, which, inhaled with the pure and invigorating breezes of spring, always brings back in remembrance a lively conception of that delightful season. Thus, in the language of poetry, 'the violet-scented gale' is synonymous with those accumulated and sweetly-blended gratifications which we derive from odors, flowers, and balmy breezes; and, above all, from the contemplation of renovated nature, once more bursting forth into beauty and perfection.

"The jasmine, also, with its dark, green leaves and little silver stars, saluting us with its delicious scent through the open casement, and impregnating the whole atmosphere of the garden with its sweetness, has been sung and celebrated by so many poets, that our associations are with their numbers rather than with any intrinsic quality in the flower itself. Indeed, whatever may have first established the rank of flowers in the poetical world, they have become to us like notes of music passed on from lyre to lyre; and whenever a chord is thrilled with the harmony of song, these lovely images present themselves, neither impaired in their beauty nor exhausted of their sweetness, for having been the medium of poetic feeling ever since the world began.

"It is impossible to expend a moment's thought upon the lily, without recurring to that memorable passage in the sacred volume—'Consider the lilies of the field, how they grow. They toil not, neither do they spin; and yet I say unto you, that Solomon in all his glory was not arrayed like one of these.' From the little common flower called heart's ease, we turn to that well-known passage of Shakspeare, where the fairy king so beautifully describes the "little western flower." And the forget-me-not has a thousand associations tender and touching, but, unfortunately, like many other sweet things, rude hands have almost robbed it of its charm. Who can behold the pale narcissus, standing by the silent brook, its stately form reflected in the glassy mirror, without losing himself in that most fanciful of all poetical conceptions in which the graceful youth is described as gazing upon his own beauty, until he becomes lost in admiration, and finally enamored of himself; while hopeless Echo sighs herself away into a sound, for the love which, having centered in such an object, was neither to be bought by her caresses nor won by her despair!

"Through gardens, fields, forests, and even over rugged mountains, we might wander on in this fanciful quest after remote ideas of pleasurable sensation connected with present beauty and enjoyment; nor would our search be fruitless, so long as the bosom of the earth afforded a receptacle for the germinating seed—so long as the gentle gales of summer continued to waft them from the parent stem, or so long as the welcome sun looked forth upon the ever-blooming garden of Nature.

"One instance more, and we have done. The 'lady rose,' as poets have designated this queen of beauty, claims the latest though not the least consideration in speaking of the poetry of flowers. In the poetic world, the first honors have been awarded to the rose, for what reason it is not easy to define, unless from its exquisite combination of perfume, form, and color, which has entitled this sovereign of flowers in one country to be mated with the nightingale; in another, to be chosen, with the distinction of red and white, as the badge of two honorable and royal houses. It would be difficult to trace the supremacy of the rose to its origin; but mankind have so generally agreed in paying homage to her charms, that our associations in the present day are chiefly with the poetic strains in which they are celebrated. After all the pains that have been taken to procure, transplant and propagate the rose, there is one kind perpetually blooming around us through the summer months, without the aid or interference of man, which seems to defy his art to introduce a rival to its own unparalleled beauty—the common wild rose. Blooming in the sterile waste, this lovely flower is seen unfolding its fair leaves where there is no beauty to reflect its own, and thus calling back the heart of the weary traveler to thoughts of peace and joy—reminding him that the wilderness of human life, though rugged and barren to the discontented beholder, has also its sweet flowers, not the less welcome for being unlooked for, nor the less lovely for being cherished by a hand unseen."

To these elegantly expressed sentiments, nothing need be added by the writer of these pages.

LAYING OUT OF FLOWER-GARDENS.—Flowers are cultivated in the borders and parterres of gardens of a mixed kind, along with kitchen vegetables and fruits; and this may be said to be the general plan in those grounds of limited space belonging to persons of moderate means, and limited in the extent of their possessions. Many, however, cultivate flowers in gardens exclusively appropriated to them, and also in the isolated clumps which decorate ornamental lawns. In whichever way, the method of culture is clearly the same; and therefore it is unnecessary for us to enter into particulars with reference to all the sizes and kinds of gardens in which flowers may be grown.

The directions given in the previous sheet on the laying out, shelter, and exposure of kitchen gardens, apply also to flower-gardens. The soil should be rich, dry, soft, and partially improved with decomposed peat and leaf mould; the exposure should be toward the sun; a free air should be allowed to play over the ground; and means should be at hand for procuring a plentiful supply of pure, soft water for irrigation. Every flower-garden, also, should possess a small store of fine washed sand as a restorative, and for scattering beneath the finer kinds of flowers when in bloom, as a protection from creeping vermin. Besides the utensils usually employed, the flower-gardener should have a pair of small scissors to clip off decayed leaves, and some strips of mat for tying up certain drooping plants.

The greatest difference of taste prevails on the subject of disposing the various parts of a flower-plot or garden. Straight-lined borders, ovals, circles, and fancy figures have each their admirers; and we should advise every one to adopt that form which will be most effective in striking the eye. If the garden is seen from a parlor window, as is often the case, the plan most agreeable is to lay out the foreground as a patch of well-shaven green, which is fresh both winter and summer; on its farther side there may be a semicircular border; then a walk; and next parterres of such form and size as will suit the extent of the ground. If the garden contain kitchen vegetables, they should be out of sight of the windows of the dwelling-house, or at least not brought ostentatiously forward. "It is more difficult," says the author of the *Florist's Manual*, "than may at first appear, to plan, even upon a small scale, such a piece of ground; nor, perhaps, would any but an experienced, scientific eye be aware of the difficulties to be encountered in the disposal of a few shaped borders interspersed with turf. The nicety consists in arranging the different parts so as to form a connected glow of color; to effect which, it will be necessary to place the borders in such a manner that, when viewed from the windows of the house, or from the principal entrance into the garden, one border shall not intercept the beauties of another—nor, in avoiding that error, produce one still greater, that of vacancies betwixt the borders, forming small avenues, by which the whole is separated into broken parts, and the general effect lost. Another point to be attended to is the just proportion of green turf, which, without nice observation, will be too much or too little for the color with which it is blended; and lastly, the breadth of the flower-borders should not be greater than what will place the roots within the reach of the gardener's arm without the necessity of treading upon the soil, the mark of footsteps being a deformity wherever it appears among flowers."

Whether all the flowers of a class—such, for instance, as violets, hyacinths, &c.—should be cultivated together, or interspersed and mingled with others, is another matter for taste to decide. The preferable plan seems to be to form a choice variety in borders and in other spots, but also to cultivate a quantity of certain sorts in compartments by themselves. Neill judiciously observes, on the choice of flowers for borders—"The plants are arranged in mingled flower-borders, partly according to their size and partly according to their color. The tallest are planted in the back part, those of middling size occupy the centre, and those of humble growth are placed in front. The beauty of a flower-border, when in bloom, depends very much on the tasteful disposition of the plants in regard to color. By intermingling plants which grow in succession, the beauty of the border may be prolonged for some weeks. In a botanic garden, the same plant cannot be repeated in the same border; but in the common flower-garden, a plant, if deemed ornamental, may be often repeated with the best effect; nothing can be finer, for example, than to see many plants of double scarlet lychnis, double sweet-william, or double purple jacobæa."

The Dutch, who are among the best flower-gardeners in the world, have lately begun to copy the English in ornamenting turf lawns with plots of various kinds of flowers; but in all their large and regular gardens, they still dispose each kind of flowers by themselves. "We ridicule this plan," says Hogg in his Treatise on Flowers, "because it exhibits too great a sameness and formality; like a nosegay that is composed of one sort of flowers only, however sweet and beautiful they may be, they lose the power to please, because they want variety. It must undoubtedly be acknowledged, that a parterre, no matter in what form—whether circular or square, elliptical or oblong—where all the shrubs, plants and flowers in it, like the flowers in a tastefully arranged bouquet, are variously disposed in neat and regulated order, is a delightful spectacle, and worthy of general imitation. Yet still, in some particular cases, I am disposed to copy the Dutchman; and I would have my bed of hyacinths distinct, my anemones, my ranunculuses, my pinks, my carnations distinct, and even my beds of hollyhocks, double blue violets, and dwarf lark-spurs distinct, to say nothing of different sorts of roses. Independently of the less trouble you have in cultivating them when kept separate, you have beauty in masses, and you have likewise their fragrance and perfume so concentrated, that they are not lost in air, but powerfully inhaled when you approach them." Leaving this question to be settled according to taste and other circumstances, we have only to recommend that no flower or herb of any kind should be sown or planted in figures resembling familiar objects. Some persons, for example, will be seen sowing annuals or planting crocuses in the figure of a letter of the alphabet, a spoon, a ship, a house, &c.—a practice so essentially vulgar that it cannot be too loudly condemned.

An error not uncommon in deciding which flowers shall be planted, is to select numbers merely for their rarity or novelty, without reference to what will be their appearance when in bloom, and which generally leads to disappointment. Unless for botanical illustration, make a choice of flowers on two principles—those which will be beautiful when in bloom, although common, and those which will bloom at the particular seasons required, to ensure a succession of variegated beauty from spring to autumn. The true amateur gardener takes a pride in improving even the commonest flowers—urging them by careful culture to the highest state of perfection as to size and brilliancy of coloring of which they are susceptible in our climate.

BALSAM OF TURPENTINE.—Melt by a gentle heat black rosin 1 lb.; remove the vessel from the fire and add oil of turpentine 1 pint.

[Cooley's Cyclopædia of Practical Receipts.]

EXHAUSTION OF LAND BY GROWING WHEAT.—To confine ourselves to Wheat—it appears from the recent researches of Dr. H. Will that 100 parts of the earthy constituents of the grain consist of—

Potass	22 to 34	parts.
Soda	16	parts.
Lime	2 to 3	parts.
Magnesia	9 to 13	parts.
Peroxide of iron	1	parts.
Phosphoric acid	49	parts.

A trace of sulphuric acid, silica, and fluorine.

whilst the earthy constituents of Wheat straw contain very little phosphoric acid, but a large amount of silica. Now, it is obvious that if the farmer continually restores all the straw to his land, but neglects, from want of knowledge, or means, to replace the earthy matter of the grain, the land will be exhausted, and he cannot continne to grow Wheat upon it.* Moreover, if he make an effort to maintain the fertility of the land for Wheat, he must restore to it every ingredient of which it becomes exhausted by his crop in a proper proportion. To know this proportion essential to the growth of every particular crop, he must have recourse to information supplied by Chemistry. One of the earthy constituents of Wheat enters so largely into many other crops, that the amount taken off the land everywhere is very great, and constitutes a considerable proportion of the total amount contained in ordinary land, so that the loss has already, in the present state of science, excited attention, and aroused the efforts of the farmer to repair it. We allude to phosphoric acid. Now, the chemist has shown, that in the bones of animals a great part of this material which has been drawn from land in the growth of vegetables is to be found, stored up in a form suitable for its restoration.

[Proposal for establishing a College of Chemistry.

* This accounts for the exhaustion of the wheat lands, in Western New-York, from twenty bushels of Wheat to the acre, twenty years ago, down to eleven bushels now. This accounts too, in part, for the check to the population of that region in the last few years. There will be general exhaustion and drain from all the other States, as long as land can be had in the West for $1 25 and *for nothing* after a few years when emigrants and their descendants get a little stronger. [*Ed. Farm. Lib.*

PRICES CURRENT.

[*Corrected, January 21, for the Monthly Journal of Agriculture.*]

ASHES—Pots, 1st sort	℔ 100 lb.	3 75	@	3 81½
Pearls, 1st sort, '45		4 12½	@	—
BEESWAX—American Yellow		— 29	@	— 29½
CANDLES—Mould, Tallow	℔ lb.	— 9	@	— 11
Sperm, Eastern and City		— 26	@	— 38
COTTON—From	℔ lb.	— 6½	@	— 9½
COTTON BAGGING—American		— 12	@	— 13
CORDAGE—American	℔ lb.	— 11	@	— 12
DOMESTIC GOODS—Shirtings	℔ y.	— 5½	@	— 11
Sheetings		— 7½	@	— 15
FEATHERS—American, live		— 28	@	— 31
FLAX—American		— 7	@	— 7½
FLOUR & MEAL—Genesee	℔ bbl.	5 68¾	@	5 75
Troy		— —	@	— —
Michigan		5 62½	@	5 68¾
Ohio, flat hoop		5 62½	@	5 68¾
Ohio, Heywood & Venice		6 50	@	6 75
Ohio, via New-Orleans		5 50	@	— —
Pennsylvania		— —	@	— —
Brandywine		— —	@	5 87½
Georgetown		5 68¾	@	5 75
Baltimore City Mills		5 62½	@	5 75
Richmond City Mills		6 62½	@	— —
Richmond Country		5 62½	@	5 75
Alexandria, Petersburg, &c		5 62½	@	5 75
Rye Flour		4 25	@	— —
Corn Meal, Jersey and Brand		3 75	@	4 —
Corn Meal, Brandywine	hhd.	17 50	@	— —
GRAIN—Wheat, Western	℔ bush.	1 20	@	1 30
Wheat, Southern	new	1 20	@	1 30
Rye, Northern		— 79	@	— 80
Corn, Jersey and North	(meas.)	— 68	@	— —
Corn, Southern	(measure)	— 70	@	— —
Corn, Southern	(weight)	— 67½	@	— 68
Oats, Northern		— 48	@	— 50
Oats, Southern		— 38	@	— 40
HAY—North River	bales	— 90	@	— 97½
HEMP—American, dew-rotted	ton	87 50	@	105 —
" " water-rotted		125 —	@	175 —
HOPS—1st sort, 1845		— 20	@	— 25
IRON—American Pig, No 1		35 —	@	37 —
" Common		25 —	@	30 —
LIME—Thomaston	℔ bbl.	— 97½	@	1 —
LUMBER—Boards, N.R.,	℔ M. ft. clr.	35 —	@	40 —
Boards, Eastern Pine		11 —	@	13 —
Boards, Albany Pine	℔ pce.	— 10	@	— 19
Plank, Georgia Pine	℔ M. ft.	— —	@	35 —
Staves, White Oak, pipe	℔ M.	48 —	@	50 —
Staves, White Oak, hhd		38 —	@	40 —
Staves, White Oak, bbl		28 —	@	30 —
Staves, Red Oak, hhd		30 —	@	31 —
Hoops		25 —	@	30 —
Scantling, Pine, Eastern		— —	@	16 25
Scantling, Oak		30 —	@	35 —
Timber, Oak	℔ cubic foot	— 25	@	— 37
Timber, White Pine		— 18	@	— 25
Timber, Georgia Yellow Pine		— 30	@	— 35
Shingles, 18 in	℔ bunch	1 75	@	2 —
Shingles, Cedar, 3 feet, 1st quality		— —	@	24 —
Shingles, Cedar, 3 feet, 2d quality		22 —	@	23 —
Shingles, Cedar, 2 feet, 1st quality		19 —	@	— —
Shingles, Cedar, 2 feet, 2d quality		16 —	@	18 —
Shingles, Cypress, 2 feet		13 —	@	14 —
Shingles, Company		— —	@	29 —
MUSTARD—American		— 17	@	— 25
NAILS—Wrought, 6d to 20d	℔ lb.	— 10	@	— 12½
Cut, 4d to 40d		— 4	@	— 4½
PLASTER PARIS—in bulk	ton	2 62½	@	— —
PROVISIONS—Beef, Mess,	℔ bbl.	8 —	@	8 50
Beef, Prime,		5 —	@	5 50
Pork, Mess, Ohio		13 —	@	13 50
Pork, Prime, Ohio		10 12½	@	10 50
Lard, Ohio	℔ lb.	— 7¾	@	— 8½
Hams, Pickled		— 7	@	— 7½
Shoulders, Pickled		— 5	@	— 5½
Sides, Pickled		— 6	@	— 6½
Beef, Smoked	℔ lb.	— 6½	@	— 7
Butter, Orange County		— 18	@	— 20
Butter, Western Dairy		— 14	@	— 17
Butter, ordinary		— 11	@	— 13
Cheese, in casks and boxes		— 7	@	— 7½
SEEDS—Clover	℔ lb.	— 10	@	— 11
Timothy	℔ tierce	16 —	@	17 —
Flax, Rough		10 25	@	10 37½
SOAP—N. York, Brown	℔ lb.	— 4	@	— 6
TALLOW—American, Rendered		— 7½	@	— 7¾
TOBACCO—Virginia	@ lb.	— 3	@	— 6
North Carolina		— 3	@	— 5
Kentucky and Missouri		— 3	@	— 7
WOOL—Am. Saxony, Fleece	℔ lb.	— 38	@	— 40
American Full Blood Merino		— 36	@	— 38
American ½ and ¾ Merino		— 30	@	— 33
American Native and ¼ Merino		— 26	@	— 28
Superfine, Pulled		— 28	@	— 30